

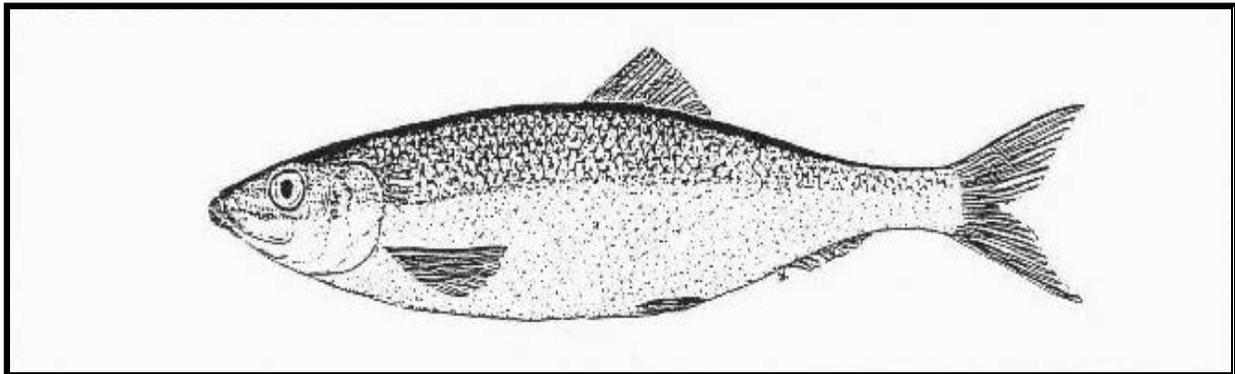
SCH No. 98052052

**FINAL**

**SUPPLEMENTAL ENVIRONMENTAL DOCUMENT**

**PACIFIC HERRING  
COMMERCIAL FISHING REGULATIONS**

(Sections 163, 163.1, 163.5, and 164, Title 14, California Code of Regulations)



**2009  
STATE OF CALIFORNIA  
THE RESOURCES AGENCY  
DEPARTMENT OF FISH AND GAME**

**FINAL SUPPLEMENTAL ENVIRONMENTAL DOCUMENT  
PACIFIC HERRING COMMERCIAL FISHING REGULATIONS**

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## **SUMMARY**

### **S.1 Introduction**

This Final Supplemental Environmental Document (FSED) to the Final Environmental Document (FED), Pacific Herring Commercial Fishing Regulations, 1998, provides the review and analysis required by California Environmental Quality Act (CEQA) Guidelines (Section 15000 et seq., Title 14, California Code of Regulations [CCR]). The review and analysis will assist the California Fish and Game Commission (Commission) in regulating the commercial harvest of Pacific herring throughout the State's ocean and estuarine waters. Specifically, the FSED reviews and evaluates proposed regulatory changes for the 2009-10 fishing season, supplementing, and in some cases replacing, aspects of the proposed project described in the 1998 FED and the FSEDs of 1999, 2000, 2001, 2002, 2004, 2005, 2006, 2007 and 2008. A Notice of Preparation (NOP) identified and incorporated concerns and recommendations of the public, resource and regulatory agencies, and the fishing industry into the review and analysis of the proposed changes contained in these documents.

The FSED includes seven chapters. Chapter 1 discusses the authorities and responsibilities under which the Final Supplemental Environmental Document (FSED) was developed and describes its intended use. Chapter 2 describes the proposed project, and alternatives, and options for regulating the commercial harvest of Pacific herring. Chapter 3 describes the existing environment where the California herring fisheries occur. Chapter 4 addresses the impacts of the proposed project and cumulative effects. Chapter 5 describes the impacts of the alternatives to the proposed project. Chapter 6 identifies consultations with other agencies, professionals, and the public. Chapter 7 responds to public comments regarding the proposed project.

The proposed project has been selected as the preferred alternative based on the analysis of this FSED. The proposed project is identified as the preferred alternative because it provides a set of regulations most likely to achieve the CEQA requirements with respect to the conservation, sustainability, maintenance, and utilization of the Pacific herring resource.

## **S.2 Proposed Project**

The proposed project is a body of regulations governing the commercial harvest of Pacific herring for roe products, bait, pet food, as fresh fish, and the harvest of herring eggs-on-kelp. The proposed project takes the form of recommendations for continuation, amendment, or change to an existing body of regulations in effect since November 22, 2008 (Sections 163, and 164, Title 14, CCR). It also includes regulations from Section 163.1 (herring permit transfers) and 163.5 (penalties in lieu of suspension or revocation-herring permittees), Title 14, CCR that were adopted by the Commission on March 2006 and October 2002, respectively.

The proposed regulatory changes will establish fishing quotas for San Francisco Bay for the 2009-10 herring fishing season, based on the most recent assessments of the spawning populations. Proposed regulatory changes will also close the open ocean herring fishery beginning in 2010. Previously established quotas for Tomales Bay, Humboldt Bay, and Crescent City Harbor fisheries are not affected by these regulatory changes.

The specific regulatory changes proposed for the 2009-10 season will: (1) provide the Commission the option to consider a quota equal to zero to ten percent of the most recent San Francisco Bay spawning biomass estimate. The Department of Fish and Game's (Department) recommendation is a zero percent harvest or no fishery option; (2) set the dates of the roe herring fishery in Tomales Bay from noon on December 27, 2009, until noon on February 26, 2010; and (3) close the open ocean herring fishery beginning in January 1, 2010. No quota changes were made for the Crescent City Harbor area, Humboldt Bay, and Tomales Bay fisheries. If the Commission decides on a greater than zero percent harvest option for San Francisco Bay, the Department recommends the quota not exceed seven percent of the San Francisco Bay 2008-09 spawning biomass and that there be one season with a common quota for all platoons (DH, Odd, and Even). Season dates of the roe herring fisheries in San Francisco Bay for all platoons (DH, Odd, and Even) would be from 5:00 p.m. on Sunday, January 3, 2010, to noon on Friday, February 26, 2010.

## **S.3 Project Alternatives**

Three alternatives are considered in this FSED. These alternatives include: (1) a no-fishery alternative; (2) a no change alternative, which uses existing regulations; and (3) establishing individual vessel quotas for gill net vessels in the roe herring fishery. Refer to Section 2.4, Project Alternatives, and Chapter 5 of this FSED, and Chapter 6 of the 1998 FED, Analysis of Alternatives, for a thorough description of alternatives and analysis of their impacts.

## **S.4 Existing Environment**

The environments most likely to be affected by the regulatory revisions outlined in this FSED are San Francisco Bay and Tomales Bay. Although the proposed project consists primarily of regulatory changes for San Francisco Bay fisheries, the existing environment potentially affected by the proposed project and alternatives also includes the open ocean and other bays in which Pacific herring occur. Herring fisheries do occur in the Crescent City Harbor area, Humboldt Bay, and the open ocean, primarily within Monterey Bay. Refer to Section 3.3 of the FED, Specific Biological and Environmental Descriptions, for a thorough description of these environments and Chapter 3 of this document for a description of the environmental setting for these areas.

## **S.5 Environmental Impacts**

### **S.5.1 Proposed Project**

An analysis of the potential impacts of the proposed project is described by this FSED. The FED identified the area with the highest potential for adverse impacts associated with the proposed regulatory changes as the San Francisco Bay area, which supports the largest roe herring fishery in the State. The following localized, short-term, and less than significant impacts were identified in the FED for several areas of potential concern including: (1) boat and vehicle traffic circulation; (2) water and air quality; (3) housing and utilities; (4) geology, scenic quality, recreation; and (5) noise. The FED found biological impacts to have the greatest potential for significant environmental impact, but found these impacts to be localized, short-term, and less than significant, with mitigation provided by the current management strategy and Pacific

herring population monitoring. Refer to Chapter 4 of the FED for a thorough environmental impact analysis of the proposed project. Any adverse impacts associated with the regulatory changes proposed by this FSED are addressed within this document.

### **S.5.2 Alternatives**

The alternatives proposed in this FSED are the same as those described in the FED. A thorough analysis of the impacts of these alternatives is provided in Chapter 6 of the FED. A summary of impacts associated with these alternatives is provided below.

#### **Alternative 1 (no project)**

Localized, short-term, and less than significant impacts to vessel and vehicle traffic circulation, water quality, air quality, housing and utilities, scenic quality, recreational opportunities, and noise levels identified for the proposed project would be eliminated or redistributed in an unpredictable manner.

#### **Alternative 2 (existing regulations)**

In most regards, the environmental impacts associated with this alternative would be comparable to those of the proposed project. Although this alternative does provide for an adjustment of quotas and season dates, it does not address certain fishery-related problems considered in amendments or changes to existing regulations. The existing regulation alternative would maintain the herring fishery regulations as amended through 2009 and would not provide for the consistent adaptive management of the State's resources.

#### **Alternative 3 (individual vessel quota)**

As addressed in detail within the FED, individual vessel quotas, rather than the platoon-based quota system currently used in the roe herring gill net fishery, could potentially increase impacts due to an increase in the number of days fished. However,

these impacts are still expected to be short-term, localized, and less than significant for most environmental categories.

Misuse of the resource could result from sorting catches to remove males from the catch or discarding unripe fish to achieve higher roe content, and therefore, higher ex-vessel prices. However, the competition between permittees, for a share of the quota, is greatly lessened under an individual quota system and may result in fewer nets likely to be lost, thus reducing impacts from "ghost" net fishing as explained in Section 4.2.6.1 of the FED.

### **S.5.3 Cumulative**

An analysis of the cumulative impacts of the proposed project revealed no additional impacts to those addressed in the FED. The proposed regulatory changes addressed by this FSED are for an existing ongoing project. An analysis of cumulative impacts is provided in Chapter 5 of the FED.

A variety of factors have the capacity to influence the Pacific herring population status in California, in addition to the proposed project including: (1) biological events; (2) competitive interactions with other pelagic fish and fisheries; (3) oceanographic events; (4) habitat loss; and (5) water quality. However, as with potential impacts from the on-going commercial harvest of Pacific herring, continued monitoring of the herring resource and oceanographic conditions should help identify any trends that would signal that the stock's reproductive potential is in jeopardy.

### **S.6 Areas of Controversy**

Status of the Pacific herring population in San Francisco Bay has been identified as the only area of controversy regarding commercial herring fishing and is addressed in Chapter 3 of this FSED.

### **S.7 Issues to be Resolved**

At issue is whether or not to provide for commercial fishing as an element of Pacific herring management in California. If commercial herring fishing is authorized, decisions to specify the areas, seasons, fishing quotas and other appropriate special

conditions under which fishing operations may be conducted are required. As discussed, one aspect of managing this and other fishery resources is the understanding that a no project alternative is considered a management tool. This document, the 1998 FED, the 1999 FSED, the 2000 FSED, the 2001 FSED, the 2002 FSED, the 2004 FSED, the 2005 FSED, the 2006 FSED, the 2007 FSED, and the 2008 FSED include a review and discussion of the proposed project as well as alternatives.

## Chapter 1. INTRODUCTION

### 1.1 Background

This Final Supplemental Environmental Document (FSED) presents the review and analysis necessary to assist the California Fish and Game Commission (Commission), the lead agency pursuant to the California Environmental Quality Act (CEQA), in taking action regarding the regulation of the commercial harvest of Pacific herring (*Clupea pallasii*) in California. It was prepared by the Department of Fish and Game (Department) for the Commission following CEQA Guidelines (Section 15000 et seq., Title 14, California Code of Regulations [CCR]). The project being considered consists of proposed changes to the regulations for the 2009-010 California Pacific herring commercial fishing season.

This FSED was prepared as a supplement to: (1) the Final Environmental Document (FED), Pacific Herring Commercial Fishing Regulations, certified by the Commission in August 1998; (2) the Final Supplemental Environmental Document (FSED), certified by the Commission in August 1999; (3) the FSED, certified by the Commission in August 2000; (4) the FSED, certified by the Commission in August 2001; (5) the FSED, certified by the Commission in August 2002; (6) the FSED, certified by the Commission in August 2004; (7) the FSED, certified by the Commission in September 2005; (8) the FSED certified by the Commission in October 2006; (9) the FSED certified by the Commission in October 2007; and (10) the FSED certified by the Commission in September 2008. The FED outlines the full proposed project consisting of the operation and management of California's Pacific herring commercial fisheries and can be found on the Department's website at:

<http://www.dfg.ca.gov/marine/herring/ceqa.asp>.

The FSEDs of 1999, 2000, 2001, 2002, 2004, 2005, 2006, 2007, and 2008 provide for revisions of the proposed project contained in the FED and regulatory revisions necessary for the 1999-2000, 2000-01, 2001-02, 2002-03, 2004-05, 2005-06, 2006-07, 2007-08 and 2008-2009 Pacific herring commercial fishing seasons, respectively. Environmental documents (DSED and FSED) were not prepared for the 2003-04 season. This FSED supplements the existing certified environmental

documents and provides revisions to the regulations for the 2009-10 Pacific herring commercial fishing season.

The Department and Commission hold the public trust for managing the State's wildlife populations, including Pacific herring. That responsibility is fulfilled by a staff of experts in marine resource management and enforcement issues related to California's Pacific herring resource. The knowledge and training represented by that expertise qualifies them to perform the review and analysis of the proposed revisions of the commercial herring harvest regulations that are contained in this document.

## **1.2 The Functional Equivalent**

CEQA requires all public agencies in the State to evaluate the environmental impacts of projects that they approve or carry out. Most agencies satisfy this requirement by preparing an Environmental Impact Report (EIR) if there are potentially significant environmental impacts. If no potentially significant impacts exist, a Negative Declaration (ND) is prepared. However, an alternative to the EIR/ND requirement exists for State agencies for activities that include protection of the environment as part of their regulatory program. Under this alternative, an agency may request certification of its regulatory program from the Secretary for Resources. With certification, an agency may prepare functional equivalent environmental documents in lieu of EIRs or NDs.

The regulatory program of the Fish and Game Commission has been certified by the Secretary for Resources. A functional equivalent, Final Environmental Document for Pacific Herring Commercial Fishing Regulations, was certified by the Commission on August 28, 1998. A new FED is required: (1) when subsequent changes are proposed in the project requiring important revisions of the previous FED due to new significant environmental impacts not considered in a previous FED; or (2) when new information of substantial importance to the project becomes available (Section 15162, Title 14, CCR and Public Resources Code (PRC) Section 21166).

The CEQA lead agency may choose to prepare a supplement to a FED instead of a new FED if only minor additions or changes are necessary to make the previous FED adequately apply to the project in the changed situation. The final supplemental document is given the same notice and public review given to a final environmental

document, and may be circulated by itself without the previous FED. The lead agency when deciding whether to approve the proposed project, considers the previous FED as revised by the supplemental environmental document (Section 15163, Title 14, CCR). A Notice of Preparation (NOP) for the DSED was circulated to interested parties on May 1, 2009. Following the release of the NOP, the 30-day public comment period pursuant to CEQA for the DSED ended June 1, 2009. Pursuant to CEQA regulations, a 45-day public comment period for reviewing the DSED was held from June 12, 2009, to July 27, 2009.

This FSED is the tenth Final Supplemental Environmental Document (FSED) to the FED prepared by the Department. The first FSED was certified by the Commission in August 1999; the second FSED was certified by the Commission in August 2000, the third FSED was certified by the Commission in August 2001, the fourth FSED was certified by the Commission in August 2002, the fifth was certified by the Commission in August 2004, the sixth was certified by the Commission in September 2005, the seventh was certified by the Commission in October 2006, the eighth was certified by the Commission in October 2007 and the ninth was certified by the Commission in September 2008. As provided for by CEQA, the Department will continue to use this method of revising Sections 163, 163.1 (the new section added in December 2005), 163.5, and 164, Title 14, CCR, for a period of approximately five to ten years. After this period, or sooner if deemed necessary, the Department will prepare a new environmental document or a fishery management plan (FMP).

### **1.3 Scoping Process**

A Director's Herring Advisory Committee (DHAC) meeting was held on April 16, 2009, in San Francisco, County of San Francisco. The DHAC consists of 26 representatives from the herring fishery, including buyers and fishermen. They are appointed by the Director and serves at his or her pleasure. Pursuant to CEQA, the Department distributed, for the Commission, a NOP to interested parties on May 1, 2009. This provided a 30-day opportunity for the Lead Agency to obtain information about the scope and content of the DSED from interested federal, state and local agencies as well as the general public.

During the scoping process in past years, several issues were raised that are not included in this FSED including; developing a threshold, harvesting only the fishable biomass, a complete history of the fishery, genetic comparisons of the Tomales and San Francisco populations, the cost of management of the fishery, and establishing a limited voluntary individual quota herring fishery. All of these issues would be better addressed in a Fishery Management Plan (FMP). FMPs are required for all marine fisheries pursuant to the Marine Life Management Act (MLMA). FMPs contain a comprehensive environmental and economic analysis of the fishery along with clear objectives and measures to ensure sustainability of that fishery. In addition to the primary requirements below, the Department seeks advice and assistance in developing FMPs from participants in the affected fishery, marine scientists, marine conservationists, and other interested parties. The primary requirements of an FMP pursuant to Fish and Game Code (FGC) Section 7072 are as follows:

- To the extent practical, each sport and commercial marine fishery under the jurisdiction of other states shall be managed under an FMP. Fishery management plans will be developed in priority order.
- Each FMP shall be based on the best scientific information and other relevant information that is available, or that can be obtained, without substantially delaying the preparation of the plan.
- To the extent that conservation and management measures in an FMP provide guidelines for overall harvest, FMPs shall allocate those increases or restrictions of harvest fairly among sport and commercial fishing interests participating in the fishery.

Specifically, each FMP shall include:

- A summary of the fishery which includes historical data, economic and social information related to the fishery, habitat and ecosystem role of the species, natural history and population dynamics, number of participants, and a history of conservation and management measures affecting the fishery.
- A fishery research protocol that includes past and ongoing monitoring, essential fishery information, identification of additional information, resources and time needed, and procedures for monitoring the fishery and for obtaining essential

fishery information.

- Measures necessary for the conservation and management of the fishery which includes limitations of the fishery, creation or modification of a restricted access program that contributes to a more orderly and sustainable fishery, procedures to establish, review and revise a catch quota, and requirements for permits.
- Measures to minimize adverse effects on habitat caused by fishing.
- Information and analysis of amount and type of bycatch if associated with the fishery and measures taken to minimize bycatch and mortality of discards.
- Criteria for identifying when the stock is overfished and measures to address overfishing if occurring.
- A procedure for review and amendment of the plan.

When an FMP is completed, it is subject to CEQA and is considered functionally equivalent to an EIR. The current 1998 FED and subsequent FSEDs serve as an interim FMP for Pacific herring until an FMP can be developed.

#### **1.4 Report Availability**

This FSED Document is available at depository libraries for each of the counties in the affected areas, at the California Fish and Game Commission office, and California Department of Fish and Game Marine Region offices. It will also be posted on the Department of Fish and Game website at [www.dfg.ca.gov/marine/herring/ceqa.asp](http://www.dfg.ca.gov/marine/herring/ceqa.asp).

#### **1.5 Authorities and Responsibilities**

The California State Legislature formulates the laws and policies regulating the management of fish and wildlife in California. It is the policy of the State to ensure the conservation, sustainable use, and where feasible, the restoration of California's living marine resources for the benefit of all the citizens of the State (FGC Section 7050). It is also the State's policy to promote the development of local fisheries and distant-water fisheries based in California in harmony with international law respecting fishing and the conservation of the living resources of the oceans and other waters under the jurisdiction and influence of the State (FGC Section 1700, Appendix 1 of the FED).

The Legislature provides further policy direction regarding herring management in FGC Sections 8550 et seq. FGC Section 8553, delegated authority from the Legislature to the Commission, whose members are appointed by the Governor, to regulate the commercial harvest and possession of Pacific herring. The remaining FGC Sections relative to herring provide for a limited entry fishery and require periodic review of regulations and policies.

The Commission holds public meetings at its discretion to consider and adopt revisions to these regulations. Recommendations and comments from the Department, other agencies, and the public are typically received at two public Commission meetings each year prior to the Pacific herring commercial fishing season. These meetings will be held for the 2009-10 season on August 6, 2009, and on September 3, 2009, in Woodland, California. The authority to prepare a supplemental environmental document is given in PRC Section 21166.

## **Chapter 2. PROJECT DESCRIPTION**

### **2.1 Project Objectives**

The proposed project, as defined in the Final Environmental Document (FED) certified by the California Fish and Game Commission (Commission) on August 28, 1998, is the regulation of Pacific herring fisheries under the State's jurisdiction. The regulations are considered for inclusion in the California Code of Regulations (CCR) to implement the State's policies for managing the commercial use of Pacific herring (Sections 163, 163.1, 163.5, and 164, Title 14, CCR). The proposed project and alternatives addressed in this Final Supplemental Environmental Document (FSED) take the form of recommendations for amendment or change to the existing body of regulations. The recommendations and alternatives are based on biological assessments of existing stock conditions and comments received from interested individuals, commercial fishermen, and from the Director's Herring Advisory Committee (DHAC). The Commission has legislatively delegated authority to act on these recommendations.

The project goal is to maintain healthy Pacific herring stocks in California. Project objectives to achieve this goal include:

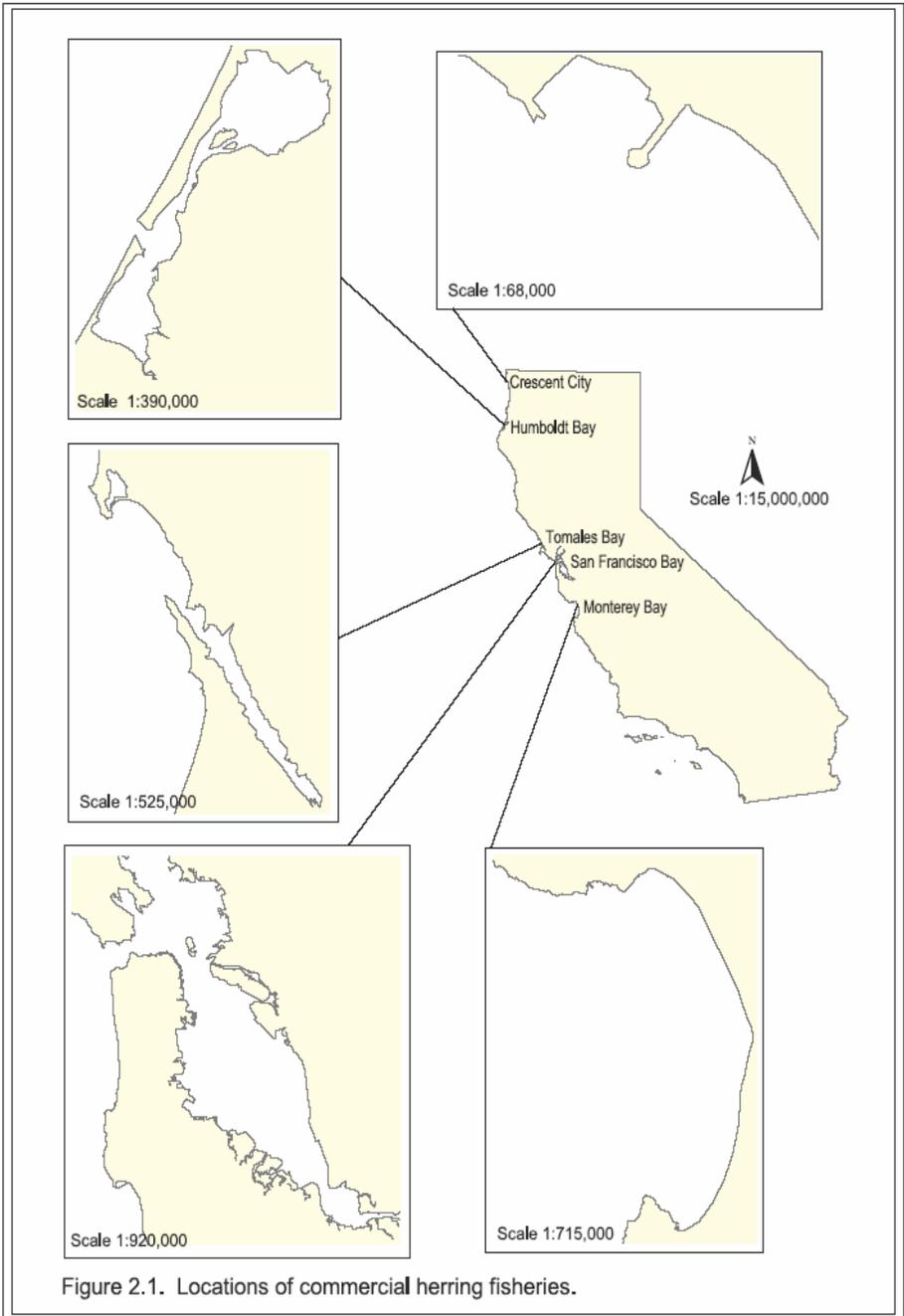
- Restore healthy age structures to stocks in need of rebuilding;
- Avoid and/or minimize the harvest of two and three-year-old herring, many of which are first-time spawners;
- Manage commercial harvest of Pacific herring to achieve a sustainable fishery;
- Provide sufficient Pacific herring to conserve living resources of the ocean that utilize herring as a food source;
- Provide sufficient Pacific herring to support recreational take.

Under existing law, herring may be taken for commercial purposes only under a revocable permit, subject to such regulations, as the Commission shall prescribe (Fish and Game Code (FGC) Section 8550). Current regulations specify permit qualifications, permit validation requirements, permit limitations, permit areas, seasons, fishing quotas, gear restrictions, and landing and monitoring requirements.

The proposed project addressed by this FSED consists of amendments and changes to existing regulations for the 2009-10 commercial herring fishing season. The proposed project adjusts the fishing quota and season dates and times that fishing operations are allowed in San Francisco Bay and season dates and times for fishing operations for in Tomales Bay. Quota recommendations for San Francisco Bay are primarily based on the most recent assessments by the Department of Fish and Game (Department) of the size of the spawning population of herring in San Francisco Bay.

## **2.2 Project Locations**

Permits have been issued for commercial herring fishing in five geographically distinct areas of the ocean and estuarine waters under the jurisdiction of the State of California (Figure 2.1). Many of the regulations considered by this document are specific to an area and type of fishing operation. This section describes each area in which regulatory changes are proposed, including current commercial fisheries for herring, and proposed seasons, quotas, and geographical restrictions for those fisheries. A complete description of commercial herring fishing areas is provided in Section 2.2 of the FED. The environmental setting for each geographical fishing area is detailed in Section 3.3 of the FED.



## 2.2.1 San Francisco Bay

The proposed commercial herring fishing dates and quotas for San Francisco Bay are as follows:

### 2.2.1.1 Roe Herring Fishery

**Season:** The Department recommends that the Commission adopt a zero percent harvest for San Francisco Bay for the 2009-2010 season. If the Commission adopts a harvest rate greater than zero, the Director's Herring Advisory Committee (DHAC) recommends having one season with a single quota for all platoons. The season would be open from 5:00 p.m. on Sunday, January 3, 2010, until noon on Friday, February 26, 2010.

**Note:** Herring fishing is not permitted from noon Friday through 5:00 p.m. Sunday (Section 163 (h)(5), Title 14, CCR).

**Quota:** The total take of herring in San Francisco Bay for commercial purposes shall be set between zero to 10 percent of the most current biomass estimate for San Francisco Bay. This quota range is based on the determination of the Department's assessment of the stock status and utilizing the best science available. The best available science includes, but is not limited to, recent fishery-independent field surveys, commercial catches, age composition, and environmental data. The Department's recommendation for the 2009-10 season is zero tons, a no fishery option. If future stock assessment results show an increase over current biomass levels, a reopening of the fishery should be considered. If the Commission chooses not to adopt the Department recommended zero percent harvest proposal then the Department asks the Commission to consider the DHAC proposal to harvest seven percent of the 2008-09 spawning biomass, which equates to a quota of 339 tons

**Note:** The overall quota for the herring roe fishery will be reduced by transfers to the herring eggs-on-kelp fishery, and the fresh fish market quota (See Section 2.2.1.2 and 2.2.1.3).

**Area:** Waters of Districts 12 and 13 and that portion of District 11 lying south of a line extending from Peninsula Point (the most southerly extremity of Belvedere Island) to the easternmost point of the Sausalito ferry dock.

1) Regulations prohibit the setting or operating of nets within 300 feet of the following piers and recreation areas: Berkeley Pier, Paradise Pier, and San Francisco Municipal Pier (between the foot of Hyde Street and Van Ness Avenue), Pier 7 (San Francisco), Candlestick

Point State Recreation Area, the jetties in Horseshoe Bay, and the fishing pier at Fort Baker. Regulations also prohibit the setting or operating of nets within 70 feet of Mission Rock Pier.

2) Regulations prohibit the setting or operating of nets in Belvedere Cove (north of a line drawn from the tip of Peninsula Point to the tip of Elephant Rock). Regulations also prohibit the setting or operating of gill nets from November 15 through March 17 in the area bounded by a line drawn from the middle anchorage of the western section of the Oakland Bay Bridge (Tower C) to the Lash Terminal buoy #5 to the easternmost point at Hunter's Point (Point Avisadero), from Point Avisadero to the Y "A" buoy to Alameda NAS entrance buoy #1 (entrance to Alameda Carrier Channel) to the Oakland Harbor Bar Channel buoy #1, and then from the first Bar Channel buoy to Tower C of the Bay Bridge.

3) Other closures affecting the fishery include United States Coast Guard enforced Homeland Security Zones: 25 yards around all Golden Gate and Bay Bridge abutments and piers; 100 yards around and under any High Interest Vessels; and Naval Vessel Protection Zones which extend 100 yards around all Naval Vessels at all times and a 500 yard slow zone surrounding all Naval Vessels. The United States Coast Guard will also enforce Rule 9 of the Code of Federal Regulations (CFR) regarding channel and harbor blockages.

#### **2.2.1.2 Herring Eggs on Kelp (HEOK) Fishery**

**Season:** December 1, 2009 to March 31, 2010

**Quota:** The Department recommends a zero percent harvest. If the Commission chooses not to adopt the Department recommended zero percent harvest proposal then the Department asks the Commission to consider the Director's Herring Advisory Committee (DHAC) alternative presented below.

A 339-ton quota for San Francisco Bay would result in a 0.56-ton individual quota for transferred "CH" gill net permits and a 0.31-ton quota for individual gill net permits.

**Note:** The combined quota for harvest of herring eggs on kelp depends on the number of "CH" and gill net permits transferred to the herring eggs on kelp fishery.

**Area:** Waters of Districts 11, 12, and 13, and that portion of District 2 known as Richardson Bay.

**Note:** The area open to the herring eggs-on-kelp fishery is further restricted. Rafts and lines may not be placed in any waters or areas otherwise closed or restricted to the use of herring gill net operations, except the areas known as Belvedere Cove and Richardson Bay or except where written permission is granted by the owners or controlling agency (e.g., Navy, Coast Guard). When rafts or lines are placed in Belvedere Cove or Richardson Bay, they must be tied to a permanent structure (e.g., pier or dock).

### **2.2.1.3 Fresh Fish Market Fishery (not for roe purposes) San Francisco Bay**

**Season:** The Department recommends a zero percent harvest. If the Commission chooses not to adopt the Department recommended zero percent harvest proposal then the Department asks the Commission to consider the alternative presented below.

November 2 through November 15, 2009, and April 1 through October 31, 2010.

**Quota:** If the Commission adopts a harvest rate greater than zero, 20 tons of the overall San Francisco Bay quota will be allotted to the fresh fish market fishery.

**Note:** No permittee may take or possess herring except in the amount specified on a current daily market order, not to exceed 500 pounds, from a licensed fish dealer.

**Area:** Same as the roe herring fishery.

### **2.2.2 Tomales Bay**

The proposed Department commercial herring fishing dates for Tomales Bay are as follows:

#### **2.2.2.1 Roe Herring Fishery**

**Season:** Noon on Sunday, December 27, 2009, until noon Friday, February 26, 2010. Weekend fishing is allowed contingent on funds made available to the Department to cover biological staff time.

**Quota:** The total take of herring for roe purposes shall not exceed 350 tons for the season.

**Area:** Tomales Bay includes the waters of District 10 lying south of a line drawn west 252° magnetic, from the western tip of Tom's Point to the opposite shore.

#### **2.2.2.2 Fresh Fish Market Fishery (not for roe purposes) Tomales Bay**

**Season:** November 2 through November 15, 2009, and April 1 through October 31, 2010.

**Quota:** 10 tons

**Note:** No permittee may take or possess herring except in the amount specified on a current daily market order, not to exceed 500 pounds, from a licensed fish dealer.

**Area:** Same as roe fishery.

### 2.2.3 Open Ocean

The proposed Department commercial herring fishing dates for the open ocean are as follows:

#### 2.2.3.1 Open Waters Fishery

**Emergency Regulatory Action:** Through emergency rulemaking, the Fish and Game Commission amended section 163 of Title 14 of the California Code of Regulations. Specifically, the Commission closed the open waters herring fishery on July 13, 2009, and will expire on January 12, 2010, to protect the San Francisco Bay Pacific herring stock. The amendment does allow for an incidental allowance of no more than 10 percent herring by weight of any load.

**Season:** April 1 to October 31 for all authorized fishing gear except in districts 16 and 17 where the season is from April 1 to November 30. Beginning January 1, 2010, all fishing for herring in ocean waters will be prohibited (except as specified in Section 163 (f)(1), Title 14, CCR. An incidental take of no more than 10 percent herring by weight of any landing composed primarily of other coastal pelagic fish species or market squid may be landed.

**Quota:** No quota is set for this fishery.

**Area:** Ocean waters are limited to the waters of districts 6 (excluding the Crescent City area), 7, 10 (excluding Tomales Bay), 16, and 17.

## 2.3 Project Characteristics

The proposed project recommends continuation of the existing regulations as modified by changes discussed below for the open ocean, San Francisco Bay and Tomales Bay fisheries. No modifications are proposed for Crescent City Harbor area or

Humboldt Bay. These regulations, as amended, will assist in the control of the commercial harvest of Pacific herring at a level that meets the State's policy with respect to the use of aquatic resources. This section states the specific purpose of the regulations and summarizes the factual basis for the regulation.

The commercial roe herring and eggs-on-kelp fisheries are closely regulated through a catch-quota system to provide for adequate protection and utilization of the herring resource. The Department conducts annual assessments of the size of the spawning population of Pacific herring in San Francisco Bay (Section 3.2.2.1, FED). These data serve as the basis for establishing fishing quotas for the following season. The principal regulatory changes proposed for the 2009-10 season included: (1) provide the Commission the option to consider a quota of zero to 10 percent of the most recent San Francisco Bay spawning biomass estimate. The Department's recommendation is a zero percent harvest or no fishery option for San Francisco Bay; (2) set the dates of the roe herring fishery in Tomales Bay from noon on December 27, 2009, until noon on February 26, 2010; (3) close the open ocean herring fishery beginning in January 1, 2010. No quota changes were made for the Crescent City Harbor area, Humboldt Bay, and Tomales Bay fisheries. If the Commission decides on a greater than zero percent harvest option for San Francisco Bay, the Department recommends the quota not exceed seven percent of the San Francisco Bay 2008-09 spawning biomass estimate and that there be one season with a common quota for all platoons. Season dates of the roe herring fisheries in San Francisco Bay for all platoons (DH, Odd, and Even) would be from 5:00 p.m. on Sunday, January 3, 2010, to noon on Friday, February 26, 2010.

Annual herring spawning population estimates from biomass surveys in San Francisco and Tomales bays have been conducted by the Department since 1973 but were discontinued in Tomales Bay in 2006-07. Spawning ground surveys in Humboldt Bay were conducted during the 1974-75, 1975-76, and 1990-91, and discontinued following the 1991-92 season; surveys were resumed beginning with the 2000-01 season, and discontinued following the 2006-07 season. Spawning ground surveys have been used to estimate spawning biomass in San Francisco, Tomales, and Humboldt bays. Spawning ground surveys assess the total number of eggs spawned

and these data are used to calculate the parental population size (Section 3.2.2.1.1 of the FED).

From 1990 through 2003, the Department derived the spawning biomass estimate in San Francisco Bay by meshing the results of the spawn deposition and hydroacoustic surveys. Beginning with the 2003-04 season, the Department conducted spawning deposition surveys as the primary assessment tool to estimate the spawning biomass. This is in conjunction with trawl surveys that are used to determine age and population structure of herring schools entering San Francisco Bay. Spawning biomass estimates for San Francisco Bay are shown in Figure 2.2. Currently, the Department does not conduct spawning biomass surveys in Tomales Bay, Humboldt Bay or the Crescent City Harbor area.

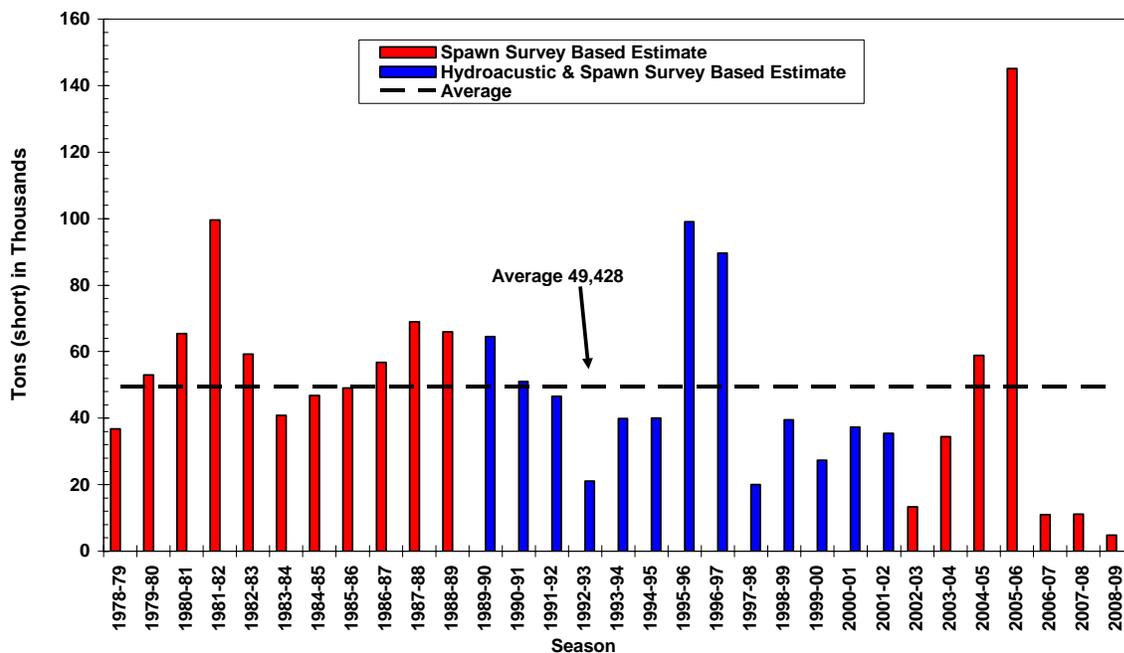


Figure 2.2 San Francisco Bay Pacific Herring Spawning Biomass Estimates for Seasons 1978 to 2009

Annual roe herring fishery quotas are conservative and were historically set to insure that the total catch did not exceed 20 percent of the previous season’s spawning biomass estimate, taking into account possible accidental overages and other management uncertainties. The previous season’s biomass is considered the best available estimate to quantify herring returning the following season. This exploitation

level was selected, based upon computer model simulations developed by the Pacific Fisheries Management Council (Section 3.2.4 of the FED), to help ensure adequate protection of the herring resource while providing long-term sustainability of the fishery. Typically, exploitation rates of no more than 15 percent have been recommended to prevent accidental overages from exceeding the 20 percent maximum harvest rate. Quotas are not determined by a fixed percentage; they are modified based on additional biological and fishery data collected each season, such as growth rates, strength and importance of individual year-classes, recruitment of incoming year-classes, and oceanographic conditions.

In addition to annual changes in quotas, management recommendations to improve or provide for the efficient harvest and orderly conduct of the herring fisheries are solicited from interested fishermen, individuals at public meetings, and DHAC. The proposed amendments to Sections 163 and 164, Title 14, CCR, addressed by this FSED, reflect both Department and the public recommendations brought forward by the Department.

### **2.3.1 Roe Herring Fisheries**

#### **2.3.1.1 San Francisco Bay 2009-10 Quota**

Despite improved oceanic conditions reported for 2008, the spawning population exhibited further decline to a new historic low. The spawning biomass estimate for the 2008-09 season is 4,844 tons, less than ten percent of the historic average (1978-79 season to present) of 49,428 tons. The estimate is a 57 percent decrease from the previous season's estimate of 11,183 tons.

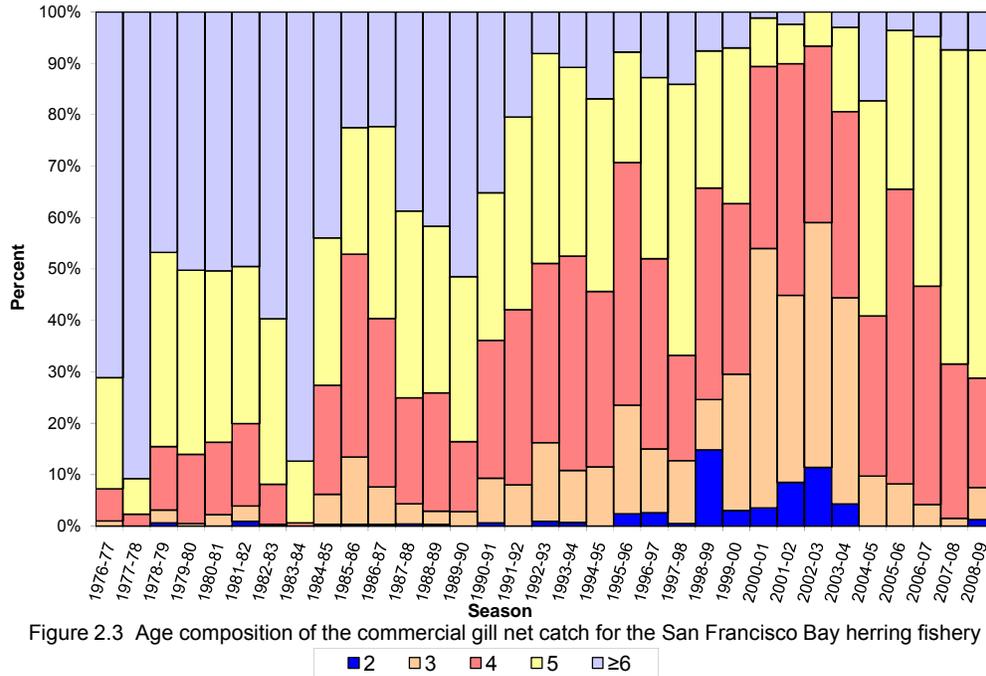
Since the 2002-03 season, the Department has expressed concern regarding the health, specifically the age structure, of the San Francisco Bay herring population. One of the Department's herring fishery management goals is to target the harvest of age four and older herring and to minimize the harvest of 2- and 3-year old fish, many of which are first-time spawners. Regulation of gill net mesh size can be an effective way of achieving this goal because it indirectly effects the ages caught by the net (size selectivity). Beginning with the 2005-06 season, the Commission reduced the minimum gill net mesh restriction to two inches. This action was taken to increase efficiency in

capturing herring, which have exhibited a coast-wide trend of decreasing mean length at age, and a truncation in age-classes. The use of 2- inch mesh gill nets in the San Francisco Bay fishery, however, has the potential to increase the take of 2- and 3-year-old fish in the commercial catch. Size selectivity and efficiency of gill nets is dependent upon mesh size, and 3-year old herring would be more vulnerable to the 2- inch mesh than the larger mesh sizes that were previously allowed, especially when growing conditions for herring are optimal. Despite reports of improved oceanic conditions in 2008, older herring did not appear to exhibit growth and better survival during the 2008-09 season.

The 2008-09 season commercial samples were aged to estimate the impact of commercial gear on the San Francisco Bay herring spawning stock. The number of 2- and 3-year old herring caught by the fishery increased by six percent from the previous season (Figure 2.3), based on age estimates from the commercial catch. The combined catch of 2- and 3-year old herring accounted for eight percent of the total commercial catch in 2008-09. The potential to take fast growing young herring (under 4-years old) could rise due to the low abundance of harvestable 4-year old and older herring. Continued monitoring of the commercial catch will ensure that the Department's management goals are maintained and younger fish are not harvested at unacceptable levels.

The Department is providing the Commission the option to consider a quota range of zero to 10 percent of the 2008-09 spawning biomass estimate of 4,844 tons. The Department is recommending a zero harvest or no fishery option for the 2009-10 season. The Department recommends this option due to the unprecedented low spawning biomass levels in San Francisco stock for three consecutive seasons, with the most recent season at a new historic low. This is the third consecutive year of a well below average spawning biomass for San Francisco Bay. It resulted in a new low of less than half of the previous biomass level estimated during the 2007-08 season. It remains unclear if potential negative effects to Pacific herring from the November 7, 2007, *Cosco Busan* oil spill have impacted the San Francisco population (see Section 3.3.2). Results from the Natural Resources Damage Assessment (NRDA) study on oil impacts to herring resources have yet to be released. If results from this study show

significant negative impacts to herring eggs and larvae in areas exposed to oil, the Department and NRDA scientists have to determine the effect this may have had on the overall strength of the 2007-08 herring year-class, subsequent year classes, and the spawning population.



Note: The percentages for 6-year olds are fish age six and above combined.

Within the overall quota for San Francisco Bay, separate quotas are established for each gill net platoon (i.e., December “DH”, Odd, and Even fishing groups). The overall quota is divided among the three platoons in proportion to the number of permits assigned to each platoon. Adjustments to quota assignments for each fishing group are calculated annually to offset attrition of permittees and the use of herring permits in the herring-eggs-on-kelp (HEOK) fishery. HEOK fishing occurs only in San Francisco Bay and the fishery is regulated under Section 164, Title 14, CCR. Individual HEOK quotas depend on the total herring fishery quota for San Francisco Bay established by the Fish and Game Commission under Section 163, Title 14, CCR. In 1994, the Commission provided HEOK permittees possessing “CH” permits with a HEOK quota equal to approximately 0.79 percent of the overall quota. All HEOK permittees must hold a

herring permit. To fish HEOK, permittees must waive herring fishing privileges under Section 163 and “exchange” their “share” of the herring quota for an equivalent HEOK quota. The current factor used to convert an equivalent amount of whole fish to the herring eggs on kelp fishery is 0.2237. This factor was derived from the round haul to gillnet conversion ratio allotted during the 1988-89 season.

### **2.3.1.2 Tomales Bay, Humboldt Bay, and Crescent City Harbor 2009-10 Quota**

The previously set quota for Tomales Bay, Humboldt Bay and Crescent City Harbor area is 350 tons, 60 tons, and 30 tons, respectively.

### **2.3.1.3 Season Dates**

Season opening and closing dates for San Francisco and Tomales bays, as well as the dates of various provisions of the regulations, are adjusted each year to account for annual changes in the calendar. The consensus of the DHAC, which met on April 16, 2009, was to recommend that the dates and times of the roe herring fisheries in San Francisco Bay be set from 5:00 p.m. on Sunday, January 3, 2010, until noon on Friday, February 26, 2010 (all gill net platoons; "DH", Odd and Even). The consensus among Tomales Bay permittees was to recommend opening at noon on Sunday, December 27, 2009, until noon Friday, February 26, 2010. The Department recommends a zero percent harvest for San Francisco Bay and agrees with the recommendation for season dates in Tomales Bay.

### **2.3.2 Ocean Waters Fishery**

Pacific herring are caught opportunistically in ocean waters, primarily in Monterey Bay, by purse seiners targeting other coastal pelagic fish species. Herring typically make up a small percentage of any given vessel's overall catch and revenue. From 1998 to 2002, intermittent herring landings were made from ocean waters, comprising approximately one percent of California's overall herring catch. However, between 2003 and 2008, the fishery landed approximately 36 percent of the overall California commercial herring catch. During this period, herring landings from ocean waters averaged 144 tons per year (ranging from 38 to 371 tons). Herring landings for this fishery occur between April and August with peak landings typically occurring in July.

From 2003 to 2008, six purse seiners participated in the open ocean herring fishery, with a combined vessel average of five landings per year. Given the recent decline in the San Francisco Bay stock of Pacific herring, the Department believes it appropriate to put in place additional conservation safeguards to protect herring during the upcoming open ocean season.

### **2.3.2.1 Closure of Ocean Waters Fishery**

#### **Emergency Regulatory Action OAL File No. 2009-0703-01 E**

An emergency action request was made by the Department to close the ocean waters fishery for the 2009 season. Through emergency rulemaking, the Fish and Game Commission amended section 163 of Title 14 of the California Code of Regulations. Specifically, the Commission closed the open waters herring fishery on July 13, 2009, and will expire on January 12, 2010, to protect the San Francisco Bay Pacific herring stock. The amendment does allow for an incidental allowance of no more than 10 percent herring by weight of any load.

To help ensure the sustainability of Pacific herring, the Department is recommending a continued closure of the ocean waters fishery for the 2010 season. The open-ocean fishery is the only herring fishery with no quota limit. A permit may be purchased by any licensed commercial fisherman, which allows the take of herring in ocean waters from April 1 to October 31 for all authorized fishing gear except in districts 16 and 17 where the season is from April 1 to November 30. A closure of the open-ocean fishery would prohibit the targeting of herring. However, schools of coastal pelagic species sometimes mix so an incidental by-catch would be allowed to minimize impact to the market squid and Pacific sardine fisheries. The by-catch rate could not exceed 10 percent herring by weight of vessel landings made by the sardine and squid fleet.

### **2.4 Project Alternatives**

Three alternatives to the proposed project are considered. These alternatives were examined and detailed in the FED, 1998, and re-examined as they apply to this FSED. Two of these alternatives take the form of additional changes to the existing

regulations that could feasibly be joined. The third alternative is a no project (no fishery) alternative. In evaluating alternatives, the comparative merits and impacts of individual alternatives that could be logically and feasibly joined should be considered as so joined unless otherwise stated. The alternatives to be considered under this FSED are:

- Alternative 1 (no project, i.e. no fishery, alternative). Under this alternative, the commercial harvest of herring would be prohibited.
- Alternative 2 (existing regulations). Under this alternative, existing regulations would be modified only by adjusting quotas to reflect current biomass estimates and by adjusting dates to reflect changes in the calendar.
- Alternative 3 (individual vessel quota for gill net vessels in herring roe fishery). Under this alternative, the proposed regulations would be modified by establishing an individual vessel quota for all gill net vessels. The proposed individual gill net vessel quota would equal the overall gill net quota divided by the number of permittees using gill net gear.

The following section states the specific purpose of the alternatives and summarizes the factual basis for determining that the alternatives are reasonably necessary.

#### **2.4.1 Alternative 1 (no project)**

This is a CEQA required alternative. It provides a reference for comparison to the proposed project and alternatives 2 and 3.

#### **2.4.2 Alternative 2 (existing regulations)**

The existing regulations for the commercial herring fishery are for the 2008-09 season. Under Alternative 2, no changes would be made to revise the herring fishing seasons by location, and adjust quotas to reflect the 2008-09 biomass estimate determined by the Department. None of the other amendments to the regulations contained in the proposed project would be considered.

#### **2.4.3 Alternative 3 (individual vessel quota)**

This alternative would establish an individual herring quota for each San Francisco Bay gill net permittee. Under existing regulations [Section 163(g)(4)(C), Title 14, CCR] an overall herring quota is established for each of the three gill net groups (platoons) in San Francisco Bay, allowing individual permittees to take and land as much fish (tonnage) as they are capable of until the overall quota for their respective group is reached. An individual permit quota has been suggested each season for the past several years. However, there has never been a clear consensus of support or opposition among industry members about this issue. The Department is concerned about the level of enforcement effort that would be necessary to effectively monitor and enforce this alternative. See Section 2.4.3 of the FED for a full description of this alternative.

## Chapter 3. ENVIRONMENTAL SETTING

### 3.1 General

Pacific herring, *Clupea pallasii*, are found throughout the coastal zone from northern Baja California on the North American coast, around the rim of the North Pacific Basin and Korea on the Asian coast (Hart 1973, Outram and Humphreys 1974). In California, herring are found offshore during the spring and summer months foraging in the open ocean. Beginning as early as October and continuing as late as April, schools of adult herring migrate inshore to bays and estuaries to spawn. Schools first appear in the deep water channels of bays to ripen (gonadal maturation) for up to two weeks, then gradually move into shallow areas to spawn. The largest spawning aggregations in California occur in San Francisco and Tomales bays. San Francisco Bay is also near the southern end of the range for Pacific herring (Miller and Schmidtke 1956).

Spawning occurs in the intertidal and shallow subtidal zones. Males release milt into the water column while females extrude adhesive eggs on a variety of surfaces including vegetation, rocks, and man-made structures such as pier pilings, boat bottoms, rock rip-rap, and breakwater structures. Embryos (fertilized eggs) typically hatch in about 10 days, determined mainly by water temperature. Larval herring metamorphose into juvenile herring in about 10 to 12 weeks. In San Francisco Bay, juvenile herring typically stay in the bay through summer, and then migrate out to sea. Research conducted on herring in Straits of Georgia, British Columbia (BC) suggests that 1- and 2-year old herring occupy inshore waters and older herring occupy shelf waters (Haegele 1997). In BC waters, juvenile herring during the summer were found in shallow nearshore waters of less than 50 meters, in shoals of similar-sized individuals. Based on the life history data of Pacific herring in BC waters there may be very little direct competition for food between age classes, and the first opportunity for direct interaction may be when herring sexually mature and join the spawning stock (Hay 2002).

Most of the herring fisheries occur during the spawning season. The roe herring gill net fisheries catch herring as they move into the shallows to spawn when the eggs

are ripest. The primary product from this fishery, *kazunoko*, is the sac roe (eggs) in the females, which are processed and exported for sale to Japan. California's roe herring fisheries occur in the Crescent City Harbor area, Humboldt Bay, Tomales Bay, and San Francisco Bay.

The San Francisco Bay herring eggs-on-kelp fishery suspends giant kelp, *Macrocystis pyrifera*, from rafts for herring to spawn on in shallow water areas. The kelp is harvested near the Channel Islands and/or in Monterey Bay and then transported to San Francisco Bay. The product of this fishery is the egg-coated kelp blades that are processed and exported to Japan. This product, *komochi* or *kazunoko kombu*, is typically served as an appetizer during New Year's celebrations.

The only open ocean fishery for herring in California occurs during the non-spawning season in Monterey Bay. Landings from this fishery enter the aquarium food and bait markets. Small fisheries for fresh fish are also permitted during the non-spawning season in Tomales Bay and San Francisco Bay. Herring are a food source for many species of birds, fish, invertebrates, and mammals. Predation is particularly high during spawning when adult fish and eggs are concentrated and available in shallow areas. Predation by birds and fish during the egg stage, when eggs are deposited in the intertidal and shallow subtidal zones, is a significant cause of natural mortality for herring.

The roe herring fishery in California has been intensively regulated since its inception in 1973, at first by the California State Legislature, then by the Fish and Game Commission (Commission). Department of Fish and Game (Department) estimates of the spawning population biomass have provided a critical source of information used for establishing fishery quotas to control the harvest of herring and provide for the long-term health of the herring resource. A thorough description of the environmental setting is provided in Chapter 3 of the 1998 Final Environmental Document (FED), which includes Pacific herring life history, ecology, status of stocks and fisheries at that time, and biological and environmental descriptions of herring fishery locations (Crescent City Harbor area, Humboldt Bay, Tomales Bay, San Francisco Bay, and Monterey Bay).

### **3.2 Spawning Population Estimation Methods**

During the 1973-1974 through 1988-89 seasons, Department estimates of San Francisco Bay herring spawning biomass were made using spawn deposition surveys (refer to Sections 3.4 and 3.5 below). From the 1990-91 through 2001-02 seasons, the Department estimated San Francisco Bay spawning biomass using a combination of spawn deposition and hydroacoustic surveys. In 2002-03, the Department was unable to generate a spawning biomass due to a wide discrepancy between the two survey methods.

The Department assessed the two methods using the Coleraine Model, as well as having an independent peer review conducted by California Sea Grant. The results indicated that the spawn deposition survey provided a better estimate of spawning biomass. Beginning with the 2003-04 season, the Department reverted to using the spawn deposition surveys alone for biomass estimation. In addition to the estimates of spawning biomass, the Department collects fishery independent age composition data from the population, as well as fishery dependent age composition data from the commercial catch. All of the information collected by the Department, including ocean conditions, is used in annual population assessments.

### **3.3 Status of the San Francisco Spawning Population**

The spawning biomass estimate for the 2008-09 season was 4,844 tons, well below the historic average (1978-79 season to present) of 49,428 tons. The estimate was a 57 percent decrease from last season's estimate of 11,183 tons. Despite beneficial oceanic conditions for herring in 2008, indicated by favorable values reported in the El Niño Southern Oscillation, Pacific Decadal Oscillation, and Upwelling Indices, the spawning population exhibited further decline to a new historic low. Unfavorable biological and environmental conditions in the bay are likely causes, which continue to hinder the San Francisco Bay stock recovery (Figure 2.2). Even if oceanic conditions continue to improve, environmental conditions in San Francisco Bay have changed during the past three seasons. Typically, winter storms bring freshwater input to the San Francisco estuary; however, dry winters have occurred for three consecutive seasons. Pacific herring require lowered bay salinity for spawning success; it is likely that the current 3-year drought and associated high bay salinity may be hindering stock

recovery. During the 2008-09 season herring traveled further up the bay, presumably seeking lower salinities, and as a result spawned near Point San Pablo for the first time since 1976.

There were 13 recorded spawning events during the 2008-09 season, spread primarily through the central and northern areas of San Francisco Bay. Spawning events were recorded from as far north as Pt. San Pablo and south to Candlestick Point. The first recorded spawn of the season occurred on November 26, 2008, and the last recorded spawn occurred on March 16, 2009 (Table 3.1). There were several small intermittent spawning events through most of the season, occurring in Richardson Bay and North along the shores of Tiburon Peninsula. Three of these spawning events made up 77 percent of the total spawn escapement for the season. This is the second consecutive season where relatively few spawn events made up such a large proportion of the overall spawn escapement. During the 2007-08 season, two large events accounted for 93 percent of the spawn escapement. Historically spawn events frequently occur on a bi-weekly basis and are similar in size. It is unusual for two or three single events to make up such a large portion of the returning biomass.

Research catch samples were collected to estimate the number of herring at age for the San Francisco Bay spawning population. During previous seasons, the herring population has experienced a truncation of age classes. The age composition for 2008-09 continues to show significant declines in the estimated numbers of age four and older herring in the spawning stock. The estimated number of age 3-, 4-, and 5-year old herring were at historic lows and the estimated number of age 1-, 2-, and 6-year old herring remained well below average (Table 3.2). The estimated number of herring in the spawning population for 2008-09 is the lowest recorded estimate and just 13 percent of an average season. The spawning biomass of age four and older herring in the spawning population, which have historically comprised the majority of the catch, decreased for the third straight season (Figure 3.1). The data indicate that the successive year classes from the 2005-06, 2004-05, and 2003-04 seasons (herring age three, four, and five respectively) have shown poor recruitment. Low recruitment decreases the availability of the spawning stock to fulfill the ecosystem function of

Pacific herring as well as jeopardizing the sustainability of the San Francisco Bay fishery. Further, the decline in older herring may continue to delay stock rebuilding.

**Table 3.1 2008-2009 San Francisco Bay Pacific Herring Biomass Estimate**  
(weights in short tons)

#	Approximate Spawn/Catch Date	Location	Submerged Veg	Shoreline	Spawn		Biomass Total
					Total	GillNet* HEOK*	
1	November 26, 2008	Richardson Bay	32.5		32.5		32.5
2	November 30, 2008	Candlestick		0.08	0.08		0.08
3	December 2, 2008	Paradise Cove	59.7		59.7		59.7
4	December 16, 2008	South Bay (gill net only)				0.1	0.1
5	December 17, 2008	Paradise Cove	6.8		6.8		6.8
6	January 13, 2009	Richardson Bay Pier 45 Fuel Dock	3.6		3.6		3.6
7	January 20, 2009	(Hyde St) Paradise/ Romberg /		14.2	14.2		14.2
8	January 20-22, 2009	Bluff Pt	302.3	802.6	1104.9	424.6	1529.5
9	January 21, 2009	Richardson Bay Richardson Bay	1055.5	8.3	1063.8		1063.8
10	January 26-28, 2009	(HEOK only)				14.8	14.8
11	February 3-5, 2009	Pt San Pablo	957.7	195.0	1152.7	82.3	1235.0
12	February 17 2009	Richardson Bay	41.6		41.6		41.6
13	February 20, 2009	Pt San Pablo	551.2		551.2		551.2
14	March 3-8, 2009	Richardson Bay	139.6		139.6		139.6
15	March 14-16, 2009	Richardson Bay	147.6	4.0	151.6		151.6
<b>n</b>	<b>spawn events = 13</b>	<b>Total in Tons</b>	<b>3298.2</b>	<b>1024.1</b>	<b>4322.3</b>	<b>507.0</b>	<b>4,844.1</b>

\* Commercial landings from herring roe (gill net) and herring-eggs-on-kelp fisheries.

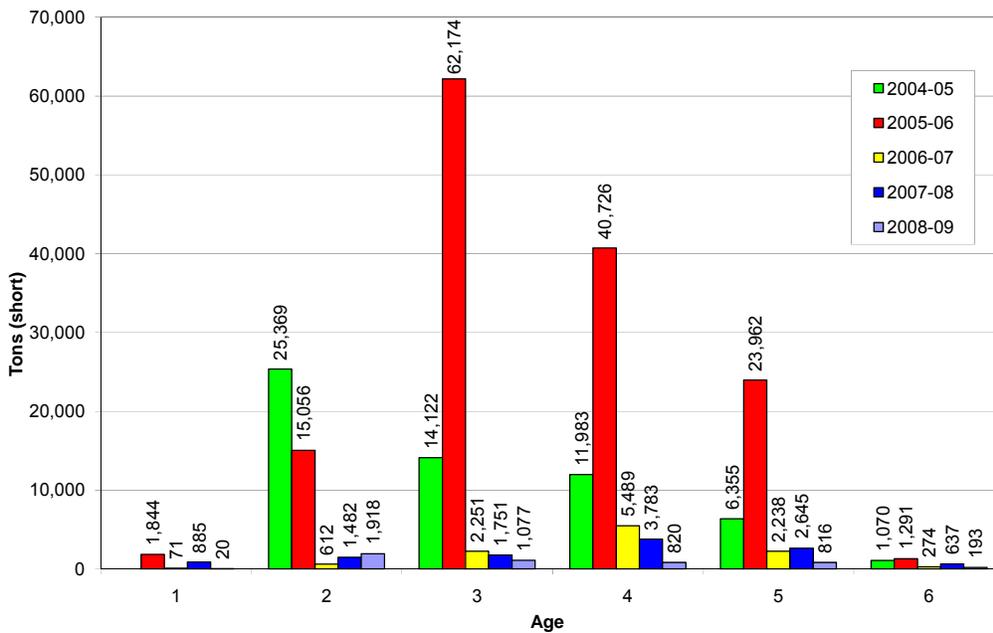


Figure 3.1 San Francisco spawning biomass by age class for the 2004-05 to 2008-09 seasons

The length-weight relationship for herring in spawning condition sampled by Department research nets in 2008-09, indicates that herring above 144 millimeters (mm) were slightly heavier in weight for a given body length (BL) compared to the previous season (Figure 3.2). Samples taken from the commercial gill net fishery showed that both the mean length and weight of San Francisco Bay herring decreased from the 2007-08 season. The mean length of herring in commercial gill net samples in 2007-08 was 186 mm BL and the mean weight was 97 grams (g). For 2008-09, the average length of herring in the commercial catch decreased to 183 mm BL with an average weight of 90 g. The length-weight relationship of herring can also be used to develop a condition factor index, which is used to describe the health of a population. The San Francisco Bay herring condition factor index showed that mature herring returning were in poor body condition when compared to the previous season (Figure 3.3). Female herring appeared to be in a similar condition as last season, while male

herring returned in a less robust state. Fish condition is used as an indicator of growth, survival, and reproductive potential.

One of the Department's herring fishery management goals is to allow the harvest of age four and older herring and to avoid the harvest of 2- and 3-year old fish, many of which are first-time spawners. Commercial age data showed a six percent increase in 2- and 3-year old herring taken by the gill net fishery compared to last season. The Department remains concerned about a coast-wide trend in decreasing mean length at age, and a truncation in age-classes, which has been reported for herring fisheries along the eastern Pacific coast since the 1997-98 El Niño.

In summary, the record low spawning biomass for 2008-09 and near record lows for successive seasons is the likely result of unfavorable oceanic conditions seen in 2005 and 2006 along with current environmental conditions within the bay. These conditions contributed to weak year classes and the large decline in the numbers of herring returning to San Francisco Bay to spawn. While oceanic conditions were reported to be improved through 2008, environmental conditions in San Francisco Bay have changed over the past three seasons. Low bay salinity is necessary for spawning success; therefore, the current 3-year drought and associated high bay salinity may be limiting stock recovery. During the 2008-09 season, herring traveled further up the bay, presumably seeking lower salinities, and as a result spawned near Point San Pablo for the first time since 1976. San Francisco Bay environmental conditions (i.e. subtidal vegetation and freshwater input) may not be optimal and could hinder stock rebuilding. The poor condition of spawning herring resulted in decreased weight, which could lead to decreased fecundity and lower commercial roe herring catches. The age structure of the population remains a concern due to the truncation of age classes combined with low estimated numbers across all age classes. If this combination persists, it may lead to an unhealthy herring population, an unsustainable fishery, and delayed stock rebuilding. Based on the strength of year classes in the San Francisco population, the short-term outlook for the fishery is poor. Conservation measures to protect the remaining biomass for next season are needed to help rebuild the herring population and provide for a sustainable fishery over the long-term.

**Table 3.2 Estimated numbers (x 1,000) of herring-at-age in the San Francisco Bay spawning population, 1982-83 to present**

Age and Percent Composition																			
Season	1	%	2	%	3	%	4	%	5	%	6	%	7	%	8	%	9	%	Total
82-83	a	N/A	87,908	14.8	149,971	0.3	182,936	30.7	118,040	19.8	30,478	5.1	17,177	2.9	8,121	1.4	797	0.1	595,428
83-84	a	N/A	332,699	56.6	69,654	0.1	92,565	15.8	73,840	12.6	17,306	2.9	1,168	0.2	117	0	0	0	587,349
84-85	a	N/A	184,695	38.7	190,998	40	46,613	9.8	22,153	4.6	25,914	5.4	6,652	1.4	688	0.1	0	0	383,033
85-86	a	N/A	162,422	32.4	160,613	32.1	126,535	25.3	26,790	5.3	16,038	3.2	7,752	1.5	717	0.1	182	0	501,049
86-87	a	N/A	168,962	29.2	194,365	33.6	134,528	23.2	64,598	11.2	9,182	1.6	6,175	1.1	1,065	0.2	246	0	579,121
87-88	a	N/A	233,193	30.6	292,508	38.3	136,604	17.9	66,494	8.7	25,337	3.3	5,027	0.7	3,939	0.5	0	0	763,102
88-89	a	N/A	146,525	25.8	222,058	39	139,906	24.6	44,435	7.8	12,310	2.2	3,030	0.5	534	0.1	0	0	568,798
89-90	a	N/A	294,631	37.6	237,377	30.3	136,248	17.4	84,361	10.8	23,970	3.1	6,572	0.8	0	0	0	0	783,159
90-91																			
91-92	1,356	0.3	13,666	3.0	126,016	28	206,930	45.2	82,870	18.1	23,764	5.2	3,490	0.8	0	0	0	0	458,092
92-93	0	0	48,925	20.5	50,398	21.1	79,045	33.1	51,713	21.7	8,642	3.6	0	0	0	0	0	0	238,723
93-94	11,485	2.6	22,403	5.1	134,870	31	160,335	36.9	63,331	14.6	25,926	6	4,808	1.1	355	0.1	0	0	423,513
94-95	2,276	0.5	39,363	9.0	236,783	54.1	94,833	21.7	42,850	9.8	18,223	4.2	3,196	0.7	0	0	0	0	437,524
95-96	3,142	0.3	483,164	38.9	359,357	29	282,069	22.7	81,768	6.6	28,904	2.3	1,687	0.1	0	0	0	0	1,240,091
96-97	1,184	0.1	290,497	29.1	359,459	36	183,370	18.4	120,029	12	33,098	3.3	8,935	0.9	270	0	0	0	996,842
97-98	42	0	45,092	17.2	129,411	49.3	65,637	25	18,724	7.1	2,259	0.9	1,430	0.5	0	0	0	0	262,595
98-99	1,931	0.4	256,816	52.0	54,306	11	114,835	23.2	56,915	11.5	9,729	2	558	0.1	978	0.2	b	0	496,068
99-00	1,440	0.4	103,490	30.4	154,260	45.3	48,150	14.1	29,000	8.5	4,310	1.3	0	0	0	0	b	0	340,650
00-01	255,158	36	178,401	35.4	185,748	36.9	65,555	13	24,267	4.8	126	0	0	0	0	0	0	0	709,255
01-02	5,788	1.5	157,182	39.6	138,752	35	75,088	18.9	15,383	3.9	4,265	1.1	152	0	0	0	0	0	396,610
02-03																			
03-04 <sup>c</sup>	2,473	0.5	328,257	65.5	122,072	24.3	26,641	5.3	14,848	3	7,225	1.4	0	0	0	0	0	0	501,516
04-05 <sup>d</sup>	0	0	287,298	33.1	360,741	41.6	166,538	19.2	44,684	5.2	8,367	1	0	0	0	0	0	0	867,628
05-06	59,112	3.2	217,177	11.7	896,819	48.3	438,877	23.6	234,285	12.6	11,202	0.6	0	0	0	0	0	0	1,857,473
06-07	2,176	1.5	11,970	8.1	37,000	25.0	70,734	47.8	23,941	16.2	2,176	1.5	0	0	0	0	0	0	147,997
07-08	24,928	16.1	31,035	20.0	25,714	16.6	42,578	27.5	24,987	16.1	5,602	3.6	0	0	0	0	0	0	154,844
08-09	623	0.8	36,786	49.6	16,211	21.8	10,599	14.3	8,105	10.9	1,870	2.5	0	0	0	0	0	0	74,194
<b>Mean</b>	<b>21,948</b>	<b>3.8</b>	<b>166,502</b>	<b>29.4</b>	<b>196,218</b>	<b>30.7</b>	<b>125,110</b>	<b>23.0</b>	<b>57,536</b>	<b>10.5</b>	<b>14,249</b>	<b>2.7</b>	<b>3,112</b>	<b>0.5</b>	<b>671</b>	<b>0.1</b>	<b>53</b>	<b>0.0</b>	<b>574,586</b>

Note: The 1990-91 and 2002-03 seasons were not estimated due to incomplete or unresolved data sets.

<sup>a</sup> 1-year-olds were not estimated, <sup>b</sup> 9-year-olds were not estimated, <sup>c</sup> includes corrected estimated number of two-year-olds, <sup>d</sup> no 1-year-olds were sampled in spawning condition

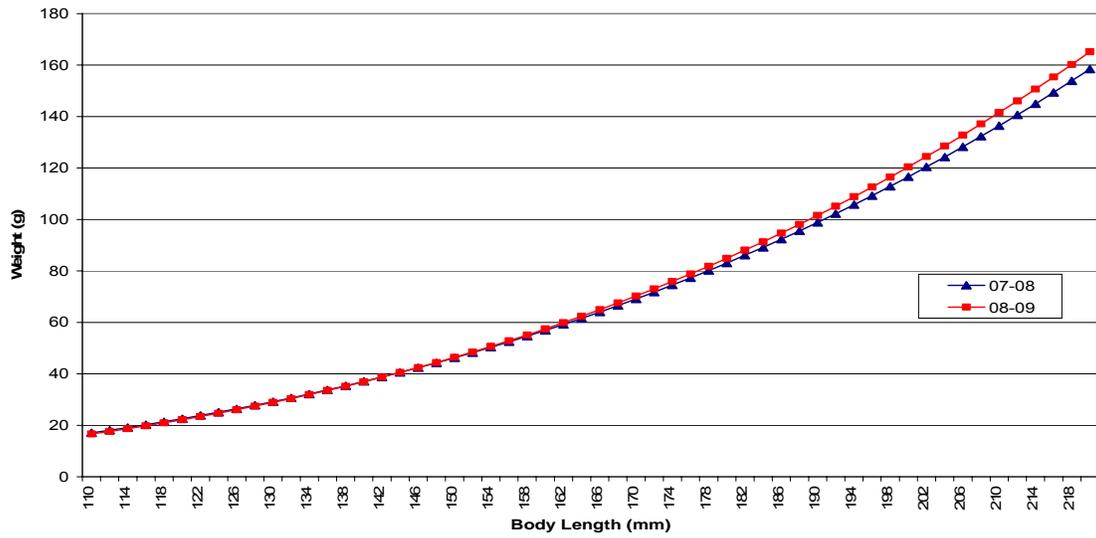


Figure 3.2 Length-weight relationships of ripe San Francisco Bay herring captured with research gear during the 2007-08 and 2008-09 seasons

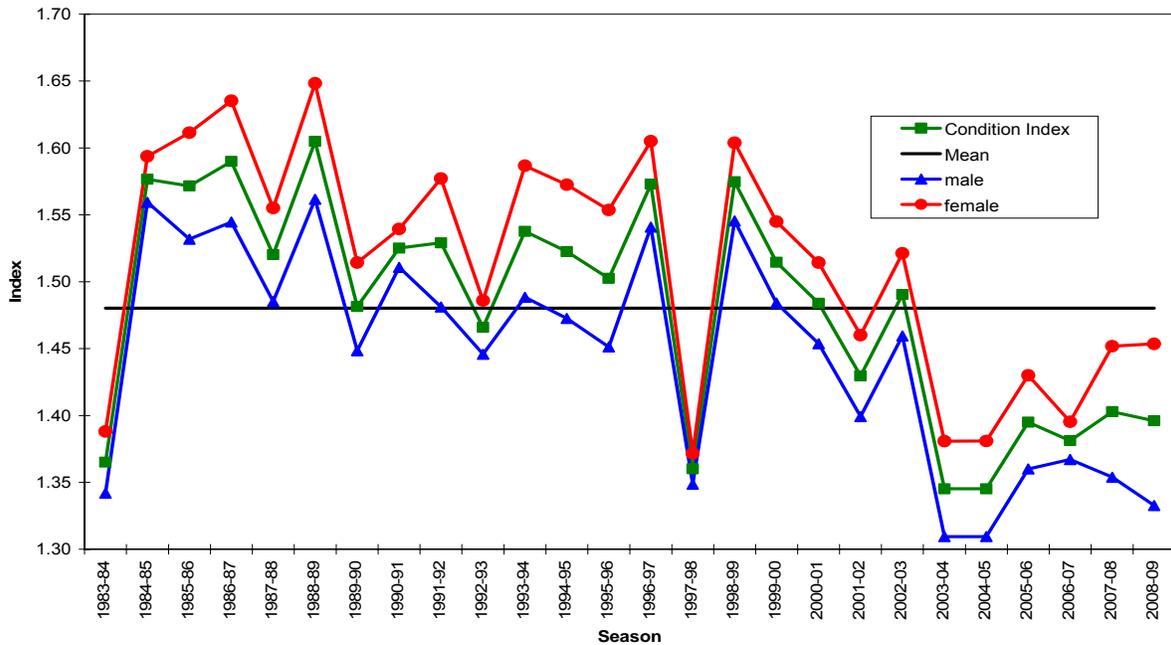


Figure 3.3 Historical condition factor indices for ripe San Francisco Bay Pacific herring Male-Female Comparison

### 3.3.1 San Francisco Bay Herring Young of the Year (YOY)

Pacific herring young-of-the-year (YOY) are commonly caught for the Interagency Ecological Program for the San Francisco Estuary by the Department's San Francisco Bay Study (SFBS) during the spring and summer of each year. The SFBS

conducts surveys to determine the abundance and distribution of invertebrates and fishes in the Western Delta and San Francisco Bay. Stations are sampled using a variety of research nets and other equipment, including a midwater trawl that is towed obliquely through the water column to capture species inhabiting varying depths. The catch from this net is used to calculate an index of abundance for YOY Pacific herring (Fleming 1999).

The herring YOY abundance index for 2008 was the second highest for the period of record (Figure 3.4). The strength of the YOY indices for the 2008 year-class indicated favorable environmental conditions for YOY survival and growth within portions of San Francisco Bay (Hieb et al, in press). However, there is no strong predictive relationship, historically, between the YOY abundance index and the subsequent numbers of two- and three-year old herring that return to spawn. Survival to first reproduction is affected by a number of factors during the first two to three years of life, including predation, food availability, competition, and environmental conditions.

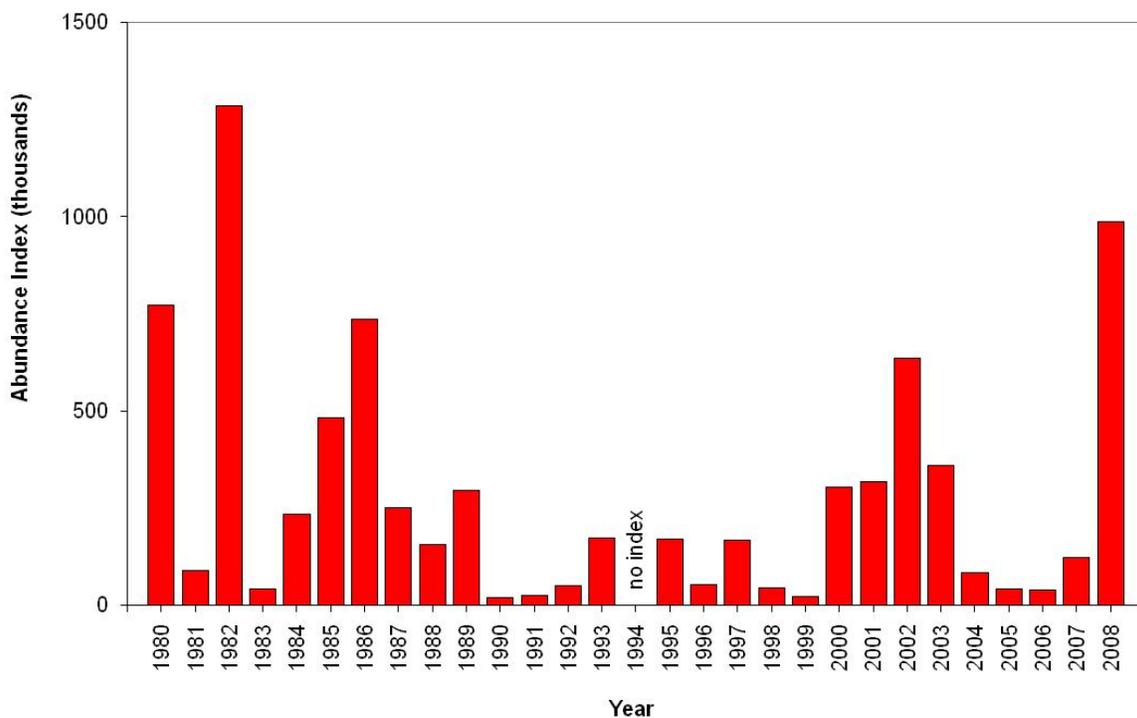


Figure 3.4 San Francisco Bay herring young-of-the-year abundance indices 1980-2008

### 3.3.2 Cosco Busan Oil Spill and Potential Impacts to San Francisco Bay Herring

On November 7, 2007, the container ship, *Cosco Busan* spilled an estimated 58,000 gallons of bunker fuel (IFO 380) into San Francisco Bay. Due to the timing of the oil spill, herring resources were potentially impacted. Since the spill occurred prior to the majority of spawning schools entering the bay, the most likely impact would be to spawning habitat and egg and larval development in contaminated areas. Previous studies, conducted after the *Exxon Valdez* oil spill, on herring egg and larval development exposed to weathered oil and polycyclic aromatic hydrocarbons (PAH) indicate impacts range from increased egg mortality to larval developmental abnormalities resulting in poor survival. Significantly higher herring egg and larval mortality was found in oiled versus non-oiled areas which supports the hypothesis that oil exposure decreases survival and hatching success in late stage embryos (McGurk and Brown 1996). Norcross et al (1996) found herring larvae from oiled areas had low growth rate and high proportions of deformities such as craniofacial defects. Larvae from un-oiled areas in Prince William Sound had less severe abnormalities due to oil exposure through the water column or contaminated prey. PAH compounds found in oil selectively disrupt embryonic cardiac function and indirectly affect other tissues that are secondary to cardiovascular dysfunction (Incardona et al 2004). Sublethal effects resulting from oil exposure such as abnormalities can become lethal at later stages and environmental variables can alter the baseline of sublethal indicators (Hose et al 1996). Carls et al (2002) reviewed the toxicological impacts on Pacific herring from the *Exxon Valdez* oil spill found four to six percent of the spawn occurred within visibly oiled areas. However, elevated concentration level of biologically available oil was found in the water, providing evidence that the primary source of herring egg oil contamination was through the water. While crude oil and bunker fuel oil may have different chemical properties, the potential oil related impacts on herring may be similar. At this time, it is unknown whether exposure of San Francisco Bay herring and herring spawning habitats to oil from the *Cosco Busan* may lead to a reduced spawning population in the near future and further delay rebuilding for an already depressed stock.

A Natural Resources Damage Assessment (NRDA) team conducted a study of egg and larval development in oiled and non-oiled areas in San Francisco Bay; however, the results have yet to be released. Field observations by Department staff

indicated that significant areas were oiled during the spill. A review of existing literature indicates that potential impacts of oil exposure on herring may negatively affect year class strength, but similarly, other environmental conditions could negatively affect year class strength. Pacific herring have an evolved reproductive strategy to withstand predation, environmental uncertainties, and stochastic events. However, the current population remains at low levels and significant increases in mortality at any life history stage can delay stock rebuilding. Additionally, the potential loss of spawning habitat due to oiling could displace spawning schools to more marginal spawning habitat, and lead to decreased spawning success. The findings of the NRDA report will assist in determining the immediate and long-term impacts to herring resources and assist in amending San Francisco Bay herring management strategies, if warranted.

### **3.3.3 Importance of Pacific Herring as a Forage Species**

As referenced in the FED, Pacific herring are an integral component to a healthy functioning marine ecosystem, making up a large portion of the diet of marine organisms from California to Alaska. Pacific herring are a mid-trophic level species that play an important role linking the lower and higher trophic levels in the food web. As a key forage species, low biomass levels of herring could impact important recreational and commercial species as well as threatened and endangered fish, marine mammals, and sea birds that rely upon on them as a food source.

Specifically, Pacific herring are a crucial part of the San Francisco Bay food web. Pacific herring, at each life history stage from egg to adult, are utilized as forage within San Francisco Bay. Spawning herring are an important food source for marine mammals and birds residing within the bay, during the winter, when many other fish leave the bay. Pacific herring eggs are consumed by at least 20 species of birds (including several species of ducks and gulls) in addition to non-avian predators such as sturgeon, surfperch, smelt and crab. Invertebrates, small perch and young salmonids have all been documented as predators of herring larvae. Juvenile herring support a wide range of San Francisco Bay species, as a food source, from spring through fall. In offshore waters, adult herring are consumed by Pacific whiting, salmon (chinook and coho), sharks, sablefish, striped bass, steelhead, Pacific cod, rockfish, and walleye

pollock. Pacific herring are also consumed by marine mammals including harbor seals, northern fur seals, California sea lions, porpoises, dolphins, and whales.

Because Pacific herring play an important role as a forage species in ocean and bay ecosystems, it is vital that management concepts take into account these complex interactions. Herring occupy a crucial intermediate trophic level, between plankton and larger predators, which is usually comprised of only a few species (typically small pelagic fish). Changes in abundance of a forage species such as herring may lead to changes in the abundance of other species. Given the low levels of the San Francisco Bay stock, the importance of protecting herring becomes vital to help ensure healthy ecosystem functioning. Due to the greatly depressed state of this stock a precautionary approach should be taken that ensures long-term sustainability of the fishery while safeguarding its importance as a forage species in a functioning ecosystem.

## Chapter 4. ENVIRONMENTAL IMPACT ANALYSIS AND CUMULATIVE EFFECTS

This chapter addresses the impacts and cumulative effects of the proposed project (changes to the commercial herring fishing regulations) on the existing environment described in Chapter 3 of this document and Chapter 3 of the Final Environmental Document (FED). The proposed project and two of the three alternatives will permit a continuation of the regulated commercial harvest of Pacific herring (*Clupea pallasii*) in California. An analysis of the impacts of the proposed project is discussed in this Final Supplemental Environmental Document (FSED).

Existing regulations permit the commercial harvest of herring in five geographical areas: San Francisco Bay, Tomales Bay, Humboldt Bay, the Crescent City Harbor area, and the open ocean. Chapter 4 of the FED examined the environmental sensitivity of each of these areas at existing harvest levels. Thirteen environmental categories were considered, including; land use, traffic circulation, water quality, air quality, housing, public utilities, geological, biological, archaeological, scenic, recreation, noise, and growth inducement. Three categories (land use, archaeology, and growth inducement) were considered to have no environmental sensitivity to commercial herring fishery activity in any of the five geographical areas and were not considered in the impact analysis. Potential impacts relative to the above categories were re-examined annually and addressed in the Supplemental Environmental Document (SED). The basis for this assessment is provided in detail in Section 4.1 of the FED.

Section 4.2 of the FED provided a detailed impact analysis for the ten categories found to have environmental sensitivity to commercial herring fishery activity. Potential impacts to traffic circulation, water quality, air quality, housing and utilities, geology, scenic quality, recreational opportunities, and noise levels that were identified as an aspect of herring fisheries varied in degree with geographic area, but all were considered to be localized, short-term, and less than significant. Some of these potential impacts are mitigated by various existing regulations.

Section 4.2.6 of the FED provided a detailed analysis of the potential environmental impacts to biological resources that exist from commercial herring fisheries. The proposed project adds no new impacts to be analyzed.

The FED divided potential impacts into two categories: (1) direct harvest impacts, and (2) trophic level impacts. Short and long-term potential adverse impacts exist within each of these categories. Many of these potential impacts are mitigated by current management practices including annual stock assessments and regulations that control harvest and fishery impacts. Others are considered localized, short-term and less than significant.

Chapter 5 of the FED provided a detailed analysis of the factors that have the capacity to influence future Pacific herring population status in California in addition to the existing herring fisheries or alternatives (cumulative effects). The proposed project introduces no new cumulative effects to those addressed by the FED. The FED discussed in detail the factors with greatest potential for cumulative effects, including continued commercial harvest of herring, unusual biological events, competitive interactions with other pelagic fish, unusual weather events, habitat loss, and water quality. Mitigation for these potential cumulative effects will be provided by annual stock assessments, annual changes in the level of harvest, or the selection of a no fishery alternative.

The Department identified and addressed impacts and cumulative effects of the proposed project on the existing environment described in Chapter 3 of the FED, subsequent FSEDs, and this FSED. No impacts were identified that were not already addressed in the FED or prior FSEDs. Other impacts identified were determined to be localized, short-term, and less than significant.

## **Chapter 5. ANALYSIS OF ALTERNATIVES**

An analysis of the potential environmental impacts of the three alternatives described in Section 2.4 is provided in Chapter 6 of the Final Environmental Document (FED). Three commercial harvest alternatives were selected for consideration by the California Fish and Game Commission (Commission) based on the California Department of Fish and Game's (Department) recommendation, public comment received during the normal review process, or in response to the Notice of Preparation (NOP). These alternatives were selected to provide the Commission with a range of commercial harvest alternatives. The two commercial harvest alternatives contain common elements with only selected elements of the management framework considered as alternatives. A "no project" (no commercial harvest of herring within California state waters) alternative is also provided.

### **5.1 Alternative 1 (no project)**

The "no project" alternative would eliminate the commercial harvest of Pacific herring (*Clupea pallas*) resources within California waters. Selection of this alternative would be expected to: (1) reduce total mortality and allow herring stocks to increase to carrying capacity; (2) increase competition between species (e.g., sardines and anchovies) occupying the same ecological niche as Pacific herring and potentially reduce standing crops of these species; (3) increase the availability of herring to predators by reducing search effort and increasing capture success; (4) eliminate the ethical concern of those opposed to the commercial harvest of herring and the scientific information on herring derived from sampling the commercial harvest; and (5) eliminate revenues to local and regional economies, and State and Federal agencies derived from the commercial harvest of herring.

Localized, short-term, and less than significant impacts to traffic circulation, water quality, air quality, housing, utilities, scenic quality, recreational opportunities, and noise levels would also be eliminated under the no project alternative. Section 6.1 of the FED provides a full analysis of the potential impacts associated with this alternative.

## **5.2 Alternative 2 (existing regulations)**

Existing regulations, adopted in 2008, were for the 2008-09 Pacific herring commercial fishing season. These regulations reflect the amendments as adopted by the Commission in September 2008. Under Alternative 2, no changes would be made to revise the herring fishing seasons by location, and adjust quotas to reflect the 2008-09 biomass estimate determined by the Department. In most regards, the environmental impacts of Alternative 2 will be similar to those of the proposed project.

Alternative 2, however, does not address problems or conditions that are addressed by the proposed project.

## **5.3 Alternative 3 (individual vessel quota)**

This alternative modifies Alternative 2 by establishing individual boat quotas for the roe herring gill net fishery in San Francisco Bay. Localized, short-term, and less than significant impacts of this alternative to circulation of traffic, water quality, air quality, housing, utilities, scenic quality, recreational opportunities, and noise levels are expected to be comparable to the proposed project. However, fishing effort could extend further into the season since the economic incentive would direct effort toward higher roe counts rather than quantity resulting in high-grading or throwing back males. Without individual boat quotas, overall quotas have typically been met long before season closure. Having the latitude to strive for higher roe counts could add incrementally to the potential impacts associated with the fishery. Section 6.3 of the FED provides further analysis of the potential environmental impacts of this alternative.

## Chapter 6. CONSULTATION

Chapter 6 of the Final Environmental Document (FED) explains the role that consultation with other agencies, professionals, and the public plays in the California Department of Fish and Game (Department) marine resource management programs. Department staff, involved in herring resource management, is in contact with other agencies, professional biologists and researchers involved in herring management on a regular basis. The U.S. Fish and Wildlife Service, NOAA-Fisheries Service, U.S. Environmental Protection Agency, and other state and federal agencies received all environmental documents that have been prepared regarding Pacific herring (*Clupea pallasii*). To date, we have not received any comments from these agencies.

Consultations also occur during the annual review of regulations guiding the commercial harvest of herring. The process began this year when the Department presented the results of its annual population assessment and discussed possible regulatory changes for the 2009-10 season with the Director's Herring Advisory Committee (DHAC) on April 16, 2009.

Proposed changes to the regulations for the 2009-10 season were modified, as necessary, based on comments from the DHAC. These recommendations were presented to the California Fish and Game Commission (Commission) at their June 25, 2009, meeting.

Prior to preparation of the DSED, the Department initiated a broader consultation by distributing a NOP that announced the intent to prepare the document dated May 1, 2009. In the NOP, the Department requested submission of views on the scope and content of the environmental information to be contained therein. The notice was distributed to members of the public and interested organizations that had expressed prior interest in herring management. The NOP was also provided to the State Clearinghouse for distribution to appropriate responsible and trustee agencies.

## **Chapter 7. RESPONSES TO COMMENTS REGARDING THE PROPOSED PROJECT**

Pursuant to Sections 2180.5 (d)(2)(vi) and 2180.5 (d)(3)(ii) of the Public Resources Code, a copy of the Draft Supplemental Environmental Document (DSED) was placed on file and made available for public review for a 45-day period. Notice was also given at the time of filing that any person interested in commenting on the DSED should do so, in writing, by 5:00 p.m. on August 6, 2009, to the Fish and Game Commission office in Sacramento. Written and oral comments relative to the DSED were also solicited by the Commission at its June 25, 2009, meeting in Woodland.

### **7.1 Summary of Comments Received**

Oral comments regarding the DSED were presented by Shanti Roberts (Oceana, California Project Manager) and Nick Sohrakoff (Directors Herring Advisory Committee Co-Chairman), at the June 25, 2009, Commission Meeting. Written comments were received by the Commission office from Shanti Roberts (Oceana, California Project Manager) in a letter dated June 15, 2009.

### **7.2 Department Responses to Comments**

#### **Shanti Roberts (Oceana, California Project Manager), in oral comment at the June 15, 2009, Commission Meeting**

##### Comment 1

Mr. Roberts stated that Oceana recommends that the Commission adopt the Department's proposal to establish a zero ton quota for the San Francisco Bay fishery.

##### Department Response

*Comment noted.*

##### Comment 2

Mr. Roberts noted the importance of Pacific herring's ecological role in the estuary as a forage species.

### Department Response

*The Department recognizes the role Pacific herring have in California's marine ecosystems as an important forage species during each life history stage from egg to adult.*

### Comment 3

Mr. Roberts stated that "management by crisis" is not good for the fish, fishermen or the ecosystem and there is a need for a minimum threshold biomass needed to allow fishing.

### Department Response

*Comment noted.*

**Nick Sohrakoff (Directors Herring Advisory Committee Co-Chairman), in oral comment at the June 15, 2009, Commission Meeting**

### Comment 1

Mr. Sohrakoff stated that although the Director's Herring Advisor Committee (DHAC) originally recommended to the Department a seven percent harvest rate for next season in San Francisco Bay, a majority of DHAC members now support the Department's zero percent harvest rate proposal.

### Department Response

*Comment noted.*

### Comment 2

Mr. Sohrakoff stated that there are concerns over a permanent fishing closure and that the buyers are concerned about losing market share.

### Department Response

*The Department will recommend reopening the San Francisco Bay herring fishery if, along with favorable biological and environmental conditions, the herring spawning population reaches a level that can sustain a fishery and Pacific herring's vital role as a forage fish.*

### Comment 3

Mr. Sohrakoff also stated that the fishermen are "eyes on the water" and are looking into continuing to help the Department biologists spot herring schools and spawning events.

Department Response

*The Department greatly appreciates the assistance locating herring schools and spawn events herring fishermen have given to the Department during past seasons and would welcome any future assistance the fishermen are able to provide.*

**Santi Roberts (Oceana, California Project Manager) Letter dated June 25, 2009**

Comment 1

Oceana urges the Commission to adopt the California Department of Fish and Game's (Department) recommendations related to the commercial herring fishery by closing the San Francisco Bay 2009/2010 fishery and the ocean fishery for the remainder of 2009 and all of 2010.

Department Response

*Comment noted.*

Comment 2

Oceana also requests that the Commission direct the Department to produce a comprehensive ecosystem-based Fishery Management Plan (FMP) for herring and other forage fish, centered on maintaining their functional role in the ecosystem through the use of an ecosystem sustainable yield approach.

Department Response

*The Department is now in the initial stages of planning for an FMP for the Pacific herring fishery. As prescribed in the Marine Life Management Act (MLMA) the Department will address ecosystem and habitat issues, relevant to the Pacific herring fishery, in the Pacific herring FMP. Several other coastal pelagic species (CPS) commercially fished in California are managed under federal fishery management plans.*

Comment 3

Oceana further recommends to the Commission that the herring fishery not be reopened until such a plan is in place.

Department Response

*Based upon experience with previous FMP development, the Department anticipates that it will take 3 to 4 years from the onset of the process until an FMP is adopted by the Commission. The Department conducts annual assessments of the size of the spawning populations of herring (spawning biomass) in San Francisco Bay. In addition to the assessment of spawning biomass, the Department examines the age structure of*

*the spawning population, growth and general condition, biological aspects of the catch, and environmental conditions. These data serve as the basis for establishing fishing quotas for the next season. The Department may recommend reopening the San Francisco Bay herring fishery before the FMP is completed if, along with favorable biological and environmental conditions, the herring spawning population reaches a level that can sustain a fishery and Pacific herring's vital role as a forage fish.*

#### Comment 4

Oceana states that continued fishing of Pacific herring at any level this year jeopardizes not only the herring population and the future viability of the herring fishery, but the many species of larger fish (including commercially and recreationally important species), seabirds and mammals that prey on these fish. Thus, Oceana recommends that the Commission must take the strong actions above to begin the recovery of San Francisco Bay herring to sustainable levels and protect its critical role in the ecosystem.

#### Department Response

*Comment noted.*

#### Comment 5

Oceana reiterates that management by crisis is not good for the fish or the ecosystem, the limit beyond which no fishing should take place has clearly been breached, and that the herring biomass threshold necessary to resume fishing is not clear.

#### Department Response

*Please see response to Comment 3 above.*

#### Comment 6

Oceana questions if it is the policy of the state to stop fishing only when the population has collapsed.

#### Department Response

*Section 7050(b) of the California Fish and Game Code states the following: "It is the policy of the state to ensure the conservation, sustainable use, and, where feasible, restoration of California's marine living resources for the benefit of all the citizens of the state."*

#### Comment 7

Oceana states that management must move towards a resource-first, ecosystem-based approach complete with catch quotas based on Ecological Sustainable Yield as

supported by MLMA, which requires that fisheries management move away from the traditional single-species management and take into account all elements of the ecosystem. Furthermore, the MLMA requires showing that fisheries and other activities are sustainable without waiting for evidence that damage is occurring before measures are taken. See Fish & Game Code Section 7050.2.

Department Response

*Comment noted.*

Comment 8

Oceana states that in 2008, visitors to San Francisco spent \$8.52 billion, generating some \$527 million in tax revenue for the state and that risking the health of the ecosystem for a fishery that brought in an average of around \$1.2 million from 2000-2007 is clearly not in the best interests of the people of California.

Department Response

*Comment noted.*

Comment 9

As the responsibility for the health of the state's wildlife has been entrusted to the Commission and Department by all Californians, fishing for herring should not resume until a comprehensive ecosystem-based management regime is in place that ensures the maintenance of their functional role in the ecosystem. This is best addressed through a comprehensive FMP. Indeed, the MLMA requires FMPs for all state marine fisheries. See Fish & Game Code Sections 7070 and 7072.6.

Department Response

*Please see response to Comment 3 above.*

Comment 10

The need for ecosystem-based management of all forage fisheries in the state of California is paramount given a burgeoning population and the effects of climate change and ocean acidification.

Department Response

*Comment noted.*

### Comment 11

Oceana states that when the state legislature passed the MLMA in 1999 they recognized the importance of the California Current ecosystem to the nation's economic and cultural activities, such as recreation, fishing, shipping, and tourism. Such activities are dependent on a healthy food web, the foundation of which is dominated by a few species that are vitally important as prey for much of the rest of the ecosystem. Herring is one of these species; others in the waters off California include sardines, anchovies, mackerel, market squid, krill, and smelts.

### Department Response

*Comment noted.*

*In addition to Oceana's specific suggestions for herring mentioned above, they provided more general recommendations for all current and potential forage fisheries managed by California in Comments 12 through 15.*

### Comment 12

Ensure forage fisheries are managed for the long-term health of the ecosystem, ensuring enough are left for larger fish, sea birds, marine mammals, and other sea life;

### Department Response

*Comment noted.*

### Comment 13

Prevent the development of new forage fisheries unless and until research shows sustainable fishing can happen without jeopardizing the ecosystem.

### Department Response

*Comment noted.*

### Comment 14

Prioritize the vital ecosystem roles of forage species over their use as feed for industrial fish farms.

### Department Response

*Comment noted.*

### Comment 15

Ensure forage fishing does not impact prey availability for predators during critical breeding and rearing life stages.

### Department Response

*Comment noted.*

### Comment 16

Oceana states that they are looking forward to working with the Commission further, to assist the Department of Fish and Game as it develops a comprehensive FMP for herring and other forage species and moves California's forage fisheries towards an ecosystem-based management approach.

### Department Response

*The Department recognizes that developing a successful FMP is a collaborative process requiring ongoing communication and participation with interested parties, thus the Department welcomes and appreciates the involvement of Oceana and others in the Pacific herring FMP preparation process.*

## **Ernie Koepf in oral comment at the August 6, 2009, Commission Meeting**

### Comment 1

Mr. Koepf stated that three San Francisco Bay herring seasons have had lower biomass estimates than the 2008-09 season estimate of 4,800 tons; 1972-73, 1977-78, and 1997-98 with 4,200, 3,700, and 3,500 tons, respectively.

### Department response

*The Department began sampling both intertidal and subtidal spawns during the 1978-79 season, thus data from spawn deposition surveys prior to that period, when only intertidal spawns were sampled, are not included in Department data summaries. The official Department spawning biomass estimate (spawn deposition and hydroacoustic survey data combined) for 1997-98 San Francisco Bay herring season is 20,000 tons.*

### Comment 2

Mr. Koepf stated that the San Francisco herring fishery is now a small scale fishery with effort at 20 percent of historic levels and that active permits have reduced from 350 to 134.

### Department response

*The Department agrees that effort has decreased for this fishery in recent years. During the 1990s, the number of herring permits peaked at over 450 with over 120 vessels participating. In contrast, during the 2008-09 season, permit renewals fell to 210 and only 30 vessels elected to participate.*

### Comment 3

Mr. Koepf stated that the smaller fishery of today is better than it was in the past.

### Department response

*Comment noted.*

### Comment 4

Mr. Koepf stated that there is no possibility for the San Francisco herring permittees to overharvest herring.

### Department response

*The Department believes that due to the depressed state of the San Francisco stock, a precautionary approach needs to be taken to ensure long-term sustainability of the fishery while safeguarding its importance as a forage species in a functioning ecosystem. A zero harvest of herring would prohibit the take of herring, protect the San Francisco stock from fishing mortality, and conserve more herring for stock rebuilding.*

### Comment 5

Mr. Koepf stated that this fishery has never exceeded its harvest ratio. Catch has been far below the 20 percent designated by the Pacific herring model.

### Department response

*The 2003 peer review of the Department's commercial Pacific herring fishery management practices found that the Department may have been overestimating the annual herring spawning population estimate by using the higher value of the spawn survey or the hydroacoustic survey as the basis for setting quotas. This method of setting quotas may have contributed to overfishing and an exploitation rate higher than optimal level of 20 percent between the 1992-93 and 2001-02 seasons.*

### Comment 6

Mr. Koepf stated that the herring fishery has never been closed and given the economic recession, the State of California must do everything possible to maintain employment.

### Department Response

*The Department understands the economic challenges facing those in the herring industry. However, the Department also believes it imperative that the resource be managed to achieve long-term sustainability.*

### Comment 7

Mr. Koepf provided the following information regarding commercial catch in San Francisco Bay. Historically, the commercial fishery catches zero percent of the most abundant 2 year old herring and 3.5 percent of the second most abundant 3 year olds, which together make up approximately 78 percent of the population. The gill net fleet harvests age 4 and 5 year old fish which make up 22 percent of the annual population, leaving 78 percent for conservation purposes.

### Department Response

*The Department agrees that the commercial fishery does have a low exploitation rate. However, given the extraordinary decline in spawning biomass (for all age classes) during the three previous seasons the Department believes a zero quota option appropriate to safeguard the remaining population. Any additional fishing related mortality will delay stock rebuilding and jeopardize the future of the resource.*

### Comment 8

Mr. Koepf noted that in previous years low biomass estimates are often followed by high estimates. He then provided an example of a low biomass season for 2004-05, followed by a record high biomass for the 2005-06 season.

### Department Response

*Comment noted.*

### Comment 9

Mr. Koepf noted that the Department's spawning biomass estimates are conservative in nature and this should be taken into account when setting quotas for this fishery. He continued by saying it would be a mistake to close the fishery without taking into account all factors.

### Department response

*The 2003 independent peer review of the Department's spawning biomass estimation methodology found that the hydroacoustic method tended to overestimate the spawning biomass, and the spawning ground survey was a better estimator of spawning biomass.*

*The Department does weigh several factors when making management decisions. These include population age structure, ocean conditions, young-of-the-year data, and herring's importance as a forage species. Given these factors and the dramatic decline in spawning biomass the Department believes a zero quota option is appropriate to safeguard the remaining population.*

**Shanti Roberts (Oceana, California Project Manager), in oral comment at the June 15, 2009, Commission Meeting**

Comment 1

Mr. Roberts stated that Oceana recommends that the Commission adopt the Department's proposal to establish a zero ton quota for the San Francisco Bay fishery.

Department Response

*Comment noted.*

Comment 2

Oceana further recommends to the Commission that the herring fishery not be reopened until a Fishery Management Plan (FMP) for herring is in place.

Department Response

*The Department may recommend reopening the San Francisco Bay herring fishery before the FMP is completed if, along with favorable biological and environmental conditions, the herring spawning population reaches a level that can sustain a fishery and Pacific herring's vital role as a forage fish.*

Comment 3

Mr. Roberts asks that the Department include ecosystem considerations in the herring FMP and ensure that enough forage species are available to fulfill role in ecosystem. Ocean would like to see an ecosystem model approach such as the model used for the Prince William Sound herring fishery.

Department Response

*The Department is now in the initial stages of planning an FMP for the Pacific herring fishery. As prescribed in the Marine Life Management Act (MLMA) the Department will address ecosystem and habitat issues, relevant to the Pacific herring fishery, in the Pacific herring FMP. Also, the Department recognizes that Pacific herring is a valuable commercial species that occupies a unique and important role in California's marine and estuary ecosystems. Given the low levels of the San Francisco Bay stock, the*

*importance of protecting herring becomes vital to help ensure healthy ecosystem functioning.*

## **Chris Lonerio, in oral comment at the August 6, 2009, Commission Meeting**

### Comment 1

Mr. Lonerio questioned the Department's methodology for collecting data, specifically the use of spawning biomass data rather than hydroacoustic data. He believes the data must be flawed, given what he perceived as huge fluctuation of spawning biomass estimates from season to season. Mr. Lonerio also expressed doubt that the Department has sufficient data to manage this resource.

### Department Response

*The 2003 independent peer review of the Department's spawning biomass estimation methodology found that the hydroacoustic method tended to overestimate the spawning biomass, and the spawn deposition survey was a better estimator of spawning biomass. The Department discontinued the hydroacoustic survey as a secondary biomass estimation technique. Coastal pelagic species such as herring are comprised of comparatively few year classes, the strength of which may vary greatly from year to year. Consequently, annual abundance may be expected to change from year to year due in part to the strength of each new incoming year class.*

### Comment 2

Mr. Lonerio expressed concern that the Department does not have adequate resources to conduct spawning ground surveys in San Francisco Bay particularly given the large area of San Francisco Bay. He continued by questioning what effect the Governor directed furloughs and State budget crisis will have on herring surveys.

### Department Response

*The Department conducts spawn surveys at minimum two times per week from November through April each season. The Department also utilizes "reports from the herring hotline" as personal communication with fishermen for assistance with locating spawning events. Based on historical data, the Department has developed a search protocol for detecting spawn locations inside San Francisco Bay. The ongoing budget crisis and the three-day per month furlough program will reduce the time available for field and laboratory work associated with herring fishery monitoring and assessment. However, Department biologists will still be conducting herring spawn deposition surveys and collecting biological data on the San Francisco Bay herring population during the 2009-10 spawning season. The shortened work schedule may reduce the amount of scientific data collected during population and biological surveys depending on the timing of spawn events and the location of herring schools in the bay.*

### Comment 3

Mr. Lonero stated that the Department website mentions herring spawn in “deep water,” on boat bottoms and eelgrass, not only along rocky shoreline. He believes the Department must use divers to locate and access spawn events.

### Department Response

*The Department believes the current methodology for collecting spawn samples is appropriate for conditions in San Francisco Bay and the Department’s spawning deposition survey methods are comparable to methods used by resource management agencies in Alaska and British Columbia. Pacific herring are known to spawn on all types of substrate (except mud) in intertidal and shallow subtidal areas of San Francisco Bay. During the herring spawning season (November-April), Department biologists systematically survey shoreline areas throughout the bay looking for signs of herring spawning activity. The Department utilizes a variety of methods to locate spawn events and estimate spawning biomass. At this time deep water spawn events remain unsubstantiated and diving in San Francisco Bay is inherently dangerous and cost-prohibitive.*

### Comment 4

Mr. Lonero requested that the Commission adopt “Option 2” and help foster a cooperative relationship between the Department and the herring industry. He believes this cooperation will lead to better and more equitable decisions.

### Department Response

*The Department values its cooperative relationship with the herring industry. Based on the best available science and to safeguard the herring population, the Department believes it appropriate to recommend a zero harvest for consideration by the Commission.*

## 7.3 Copies of Letters Received



June 25, 2009

President Cindy Gustafson  
California Fish and Game Commission  
1416 Ninth Street  
Sacramento, CA 95814

**RE: Herring Fishery Management**

Dear President Gustafson and Commissioners:

We appreciate the opportunity to provide comments on the San Francisco herring fishery and fisheries for forage species more generally. We urge you to adopt the California Department of Fish and Game's (DFG) recommendations related to the commercial herring fishery by closing the San Francisco Bay 2009/2010 fishery and the ocean fishery for the remainder of 2009 and all of 2010. We also request that the Commission direct the Department to produce a comprehensive ecosystem-based Fishery Management Plan (FMP) for herring and other forage fish, centered on maintaining their functional role in the ecosystem through the use of an ecosystem sustainable yield approach. We further recommend the fishery not be reopened until such a plan is in place.

As you know, the Department's 2009 Draft Supplemental Environmental Document on Pacific Herring Commercial Fishing Regulations (SED) paints a very clear picture of the poor health of the San Francisco Bay herring population:

- o Third consecutive year of unprecedented low levels of spawning biomass, with 2009 being the lowest ever recorded (less than 10% of the historic average);
- o Significant declines in the estimated numbers of older herring in the spawning stock, including record lows of age 3-5 herring;
- o Poor recruitment in age 3-5 herring, which may continue to delay stock rebuilding;
- o Returning biomass has been unusually dependent on very few spawning events;
- o Individual female herring are in poor condition, indicating possible poor growth, survival and reproductive potential; and
- o Coastwide trend in decreasing mean length at age and truncation in age classes since the 1997-1998 El Nino.

It is equally clear that continued fishing at any level this year jeopardizes not only the herring population and the future viability of the herring fishery, but the many species of larger fish (including commercially and recreationally important species), seabirds and mammals that prey on these fish. Thus, the Commission must take the strong actions above to begin the recovery of San Francisco Bay herring to sustainable levels and protect its critical role in the ecosystem.

President Cindy Gustafson  
San Francisco Bay Herring – Forage Fisheries  
June 25 2009

Management by crisis is not good for the fish, the ecosystem, or the fishery. Although the limit beyond which no fishing should take place has clearly been breached, the herring biomass threshold that needs to be reached to resume fishing is not clear. This question has been brought to the Department's and Commission's attention in previous years through the scoping process for this fishery,<sup>1</sup> but remains unanswered. Is it then the policy of the State to stop fishing only when the population has collapsed? If not, then management must move towards a resource-first, ecosystem-based approach complete with catch quotas based on Ecological Sustainable Yield. Such an approach is supported by the MLMA, which requires that fisheries management move away from the traditional single-species management paradigm toward a holistic approach that takes into account all elements of the ecosystem. Furthermore, the MLMA requires showing that fisheries and other activities are sustainable without waiting for evidence that damage is occurring before measures are taken. See Cal Fish & Game Code § 7050.<sup>2</sup>

The importance of ensuring the viable ecological function of herring in the San Francisco Bay ecosystem is uncontested. As one of relatively few mid-level forage species, they play an important role linking primary production to the higher trophic levels in the food web, including larger commercially and recreationally important fish, marine mammals and seabirds. As documented in the Department's 2009 SED during the winter spawning season, Pacific herring eggs are consumed by at least 20 species of birds, invertebrates, perch and salmon, while juvenile herring support a wide range of Bay species during the rest of the year.<sup>3</sup> Once they have left the bay, herring are consumed by Chinook and coho salmon, rockfish, sharks and many other species of larger fish, in addition to harbor seals, California sea lions, porpoises, dolphins, and whales. The ED concludes that due "to the greatly depressed state of this stock a precautionary approach should be taken that ensures long term sustainability of the fishery while safeguarding its importance as a forage species in a functioning ecosystem."<sup>2</sup>

Equally uncontested is the importance of the Bay ecosystem to the thriving tourism industry in the Bay area, which draws visitors from all over the world. In 2008, visitors to San Francisco spent \$8.52 billion, generating some \$527 million in tax revenue for the state.<sup>4</sup> Risking the health of the ecosystem for a fishery that brought in an average of around \$1.2 million from 2000-2007<sup>5</sup> is clearly not in the best interests of the people of California. As the responsibility for the health of the state's wildlife has been entrusted to the Commission and Department by all Californians, fishing for herring should not resume until a comprehensive ecosystem-based management regime is in place that ensures the maintenance of their functional role in the

<sup>1</sup> Mentioned in eg the final Supplemental Environmental Documents from 2005 through 2009 in Section 1.3.

<sup>2</sup> The MLMA's overriding goal is "to ensure the conservation, sustainable use, and, where feasible, restoration of California's marine living resources." Cal. Fish & Game Code § 7050(b). This includes conserving "the health and diversity of marine ecosystems and marine living resources" and only authorizing "those activities and uses of marine living resources that are sustainable." *Id.* at (b)(1), (2). See also California Department of Fish and Game Interpretation, <http://www.dfg.ca.gov/marine/mlma/index.asp#fisheries>, June 19, 2009

<sup>3</sup> DFG 2009. Draft Supplemental Environmental Document. Pacific Herring Commercial Fishing Regulations. Undated. pp.3-14 and 3-15

<sup>4</sup> San Francisco Chronicle, May 12 2009. San Francisco Tourism Revenue Increased Slightly Despite Recession. Accessed at <http://www.sanfranciscosentinel.com/?p=26406> on June 22 2009.

<sup>5</sup> CDFG California Marine Fisheries Commercial Landings Data Table 15 for 2000-2007, available at <http://www.dfg.ca.gov/marine/fishing.asp#Commercial>. Accessed June 22 2009.

President Cindy Gustafson  
San Francisco Bay Herring – Forage Fisheries  
June 25 2009

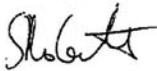
ecosystem. This is best addressed through a comprehensive FMP. Indeed, the MLMA requires FMPs for all state marine fisheries. *See* Cal. Fish & Game Code §§ 7070, 7072.<sup>6</sup> } 9 cont.

The need for ecosystem-based management of all forage fisheries in the state of California is paramount given a burgeoning population and the effects of climate change and ocean acidification. In passing the MLMA in 1999, the Legislature clearly recognized the importance of the California Current ecosystem to the economy, culture, and well-being of the West Coast states as well as the American way of life, by providing opportunities to millions of Americans for recreational activities, commercial fishing, critical commerce supply links, subsistence and personal use, and a variety of economic activities including tourism. Such activities are dependent on a healthy food web, the foundation of which is dominated by a few species that are vitally important as prey for much of the rest of the ecosystem. Herring is one of these species; others in the waters off California include sardines, anchovies, mackerel, market squid, krill, and smelts. In addition to the specific suggestions related to herring above, we provide these more general recommendations on all current and potential future forage fisheries managed by California: } 10 } 11

1. Ensure forage fisheries are managed for the long-term health of the ecosystem, ensuring enough are left for larger fish, sea birds, marine mammals, and other sea life; } 12
2. Prevent the development of new forage fisheries unless and until research shows sustainable fishing can happen without jeopardizing the ecosystem; } 13
3. Prioritize the vital ecosystem roles of forage species over their use as feed for industrial fish farms; and } 14
4. Ensure forage fishing does not impact prey availability for predators during critical breeding and rearing life stages. } 15

In summary, the State of California must not use population collapse as the fishery control for restricting fishing. The goal of management as it relates to forage species in California should be the maintenance of vigorous populations to assure the long-term viability, resilience, biodiversity and general health of California's ocean and coastal ecosystems and the communities that depend upon them. We look forward to working with you further, to assist the Department of Fish and Game as it develops a comprehensive FMP for herring and other forage species and moves California's forage fisheries towards an ecosystem-based management approach. } 16

Sincerely,



Santi Roberts  
California Project Manager

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<sup>6</sup> Cal Fish & Game Code § 7072 "Fishery management plans shall form the primary basis for managing California's sport and commercial marine fisheries." *See also* *Id.* at § 7070 "The Legislature finds and declares that the critical need to conserve, utilize, and manage the state's marine fish resources and to meet the policies and other requirements stated in this part require that the state's fisheries be managed by means of fishery management plans."

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# **Appendix A**

## **Summary of Changes**

## Summary of Changes to the 2008 Draft Supplemental Environmental Document for Pacific Herring Commercial Fishing Regulations

This appendix provides a summary of the changes made to the Draft Supplemental Environmental Document (DSED) based on updated age data for San Francisco Bay and minor grammatical changes for clarity.

### General changes throughout the Document

- References to the DSED were changed to FSED (Final Supplemental Environmental Document) where applicable.
- Misspellings, grammatical errors, and errors in graph or table identification were corrected.

### Table of Contents

- The table of contents was revised to match page numbers that changed due to finalizing the FSED.
- Chapter 7, Responses to Comments Regarding the Proposed Project, was added.
- Appendix A, Summary of Changes was added.

### Summary

- The following text was changed in S.1 Introduction, paragraph 2 to show the number of chapters in the FSED: The FSED includes seven chapters.
- The following text was added to S.1 Introduction, paragraph 2: Chapter 7 responds to public comments regarding the proposed project.

### Chapter 1. Introduction

- No changes

### Chapter 2. Project Description

- The following text was added to Section 2.2.3.1 to describe an Emergency Regulatory Action taken by the Commission: Through emergency rulemaking, the Fish and Game Commission amended section 163 of Title 14 of the California Code of Regulations. Specifically, the Commission closed the open waters herring fishery on July 13, 2009, and will expire on January 12, 2010, to protect the San Francisco Bay Pacific herring stock. The amendment does allow for an incidental allowance of no more than 10 percent herring by weight of any load.
- Section 2.3.1.1, paragraph 3 was updated using final age data as follows: The 2008-09 season commercial samples were aged to estimate the impact of commercial gear on the San Francisco Bay herring spawning stock. Based on estimates from the commercial catch, the percent of 2- and 3-year old herring caught by the fishery increased by six percent from the previous season (Figure 2.3). The combined catch of 2- and 3-year old herring accounted for eight percent of the total commercial catch in 2008-09. The potential to take fast growing young herring (under 4-years old) could rise due to the low abundance

of harvestable 4-year old and older herring. Continued monitoring of the commercial catch will ensure that the Department management goals are maintained and younger fish are not harvested at unacceptable levels.

- Figure 2.5 was updated using final age data of herring based on otolith readings. The DSED has preliminary age data based on fish lengths for 2008-09.
- The following text was added to Section 2.3.2.1 to describe an Emergency Regulatory Action taken by the Commission (OAL File No. 2009-0703-01 E): An emergency action request was made by the Department to close the ocean waters fishery for the 2009 season. Through emergency rulemaking, the Fish and Game Commission amended section 163 of Title 14 of the California Code of Regulations. Specifically, the Commission closed the open waters herring fishery on July 13, 2009, and will expire on January 12, 2010, to protect the San Francisco Bay Pacific herring stock. The amendment does allow for an incidental allowance of no more than 10 percent herring by weight of any load.
- The following sentence in Section 2.3.2.1, paragraph 1 was replaced for clarification: To help ensure the sustainability of Pacific herring, the Department is recommending a continued closure of the ocean waters fishery for the 2010 season.

### Chapter 3. Environmental Setting

- The following sentence in Section 3.3, paragraph 3 was replaced for clarification: The preliminary age composition for 2008-09 continues to show significant declines in the estimated numbers of age four and older herring in the spawning stock.
- Table 3.2 was updated using final age data of herring based on otolith readings. The DSED has preliminary age data based on fish lengths for 2008-09.
- Figure 3.1 was updated using final age data of herring based on otolith readings. The DSED has preliminary age data based on fish lengths for 2008-09.
- The following sentence in Section 3.3, paragraph 5 was replaced for clarification: Commercial age data showed a six percent decrease in 2- and 3-year old herring taken by the gill net fishery compared to last season.
- Minor editorial changes were made.

### Chapter 4. Environmental Impact Analysis and Cumulative Effects

- No changes

### Chapter 5. Analysis of Alternatives

- No changes

### Chapter 6. Consultation

- The following sentence in Section 6, paragraph 3, was replaced for clarification: These recommendations will be presented to the California Fish and Game Commission at their June 25, 2009, meeting.

### Chapter 7. Responses to Comments

- This chapter is added to all Final Supplemental Environmental Documents where comments are received.

Appendix A Summary of Changes

- Added to the FSED.